S. HRG. 98-1186

REVIEW OF THE STATUS OF THE U.S. DOMESTIC URANIUM MINING AND MILLING INDUSTRY

HEARING

BEFORE THE

SUBCOMMITTEE ON
ENERGY RESEARCH AND DEVELOPMENT

OF THE

COMMITTEE ON
ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

NINETY-EIGHTH CONGRESS

SECOND SESSION

TO

CONSIDER THE DEPARTMENT OF ENERGY/ENERGY INFORMATION ADMINISTRATION COMPREHENSIVE REVIEW OF THE STATUS OF THE U.S. DOMESTIC URANIUM MINING AND MILLING INDUSTRY

SEPTEMBER 12, 1984

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REVIEW OF THE STATUS OF THE U.S. DOMESTIC URANIUM MINING AND MILLING INDUSTRY, MAY, 1984

WEDNESDAY, SEPTEMBER 12, 1984

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
SUBCOMMITTEE ON ENERGY RESEARCH AND DEVELOPMENT,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:05 p.m., in room SD-366, Dirksen Office Building, Hon. Pete V. Domenici, presiding.

Present: Senators Domenici, Warner, and Bingaman.

Also present: Paul Gilman, professional staff member; Benjamin S. Cooper, professional staff member for the minority; and James T. Bruce, counsel for the minority.

OPENING STATEMENT OF HON. PETE V. DOMENICI, A U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator DOMENICI. The subcommittee will come to order, please. If you will, please, we are going to try to get finished in a couple of hours. Frankly, I didn't expect as many people as are here.

I based that assumption on the state of the uranium industry. I thought maybe we could have met in a little room with three or four, but I am pleased that you are here.

Today we will review the status of the uranium industry and the Department of Energy's comprehensive analysis of the uranium mining and milling industry.

The Department of Energy will review the report on this matter and the Energy Information Administration will review its analysis which comprised a good part of the report.

In addition, we will receive comments on the state of the industry from the Rocky Mountain Energy, the American Mining, Sequoyah Fuels Corp., Pathfinder Mines, Union Carbide, Western Nuclear, and the Oil and Chemical and Atomic Workers International Union. The Edison Electric Institute was asked to present testimony, but they declined.

Before we hear from the Department of Energy I would like to take just a few moments to express some thoughts here today.

Approximately 3 years ago I concluded a hearing on this subject by indicating that maintaining a viable U.S. uranium industry is not just the policy of the Federal Government but also a law which must be enforced. Over the past 3 years I have been aware of and participated and studied actions of the Energy Department relative to maintaining a viable uranium industry.

I strongly believe we have not solved the problem we set out to solve 3 years ago. In fact, I firmly believe that problem has gotten worse, and I think that DOE has contributed to making it worse or at the bare minimum hasn't done anything to make it better. Policies which make the future of the industry more bleak have been pursued.

At the annual symposium of the Uranium Institute last week the President of Mexico said that the provisions of the recent DOE enrichment contract relating to variable tails assays will reduce uranium demand by 35 million pounds of uranium. The report completed by the Energy Department does everything but conclude that the uranium industry is not viable, yet indications are that we can expect the viability finding due out of the Department to conclude that the industry is in fact viable.

Perhaps a brief reflection on the basis of this viability determination may be of interest to all the participants in this debate.

Members of the Congress and the executive branch that established the viability requirement had a much better understanding of what it meant and I believe much stronger conviction to ensure that the uranium industry is in fact maintained in a viable state. I really believe they intended that.

William Anders, Commissioner of the AEC in 1974, said that in that year if, quote,

> There was any indication that the proposed lifting of enrichment limitations is endangering domestic industry viability, U.S. self-sufficiency or our national security, the Commission will reimpose restrictions or take such other steps as might be appropriate.

When discussing this policy, I should add that Mr. Anders stated in 1974 that, quote, "The days of so-called cheap foreign uranium are over; no such thing exists. These factors work to preclude * * *" continuing with his quote, "* * * massive U.S. dependence on foreign sources of supply."

Obviously that is another prediction that they were wrong on.

In 1974, the AEC was well aware of the basis of their decision to permit the use of foreign uranium in U.S. reactors. To paraphrase, if foreign uranium in any way negatively affected the U.S. uranium industry, then appropriate action at that point, not studies, would be undertaken.

In addition, it was generally believed that at that time, that there were no such things as cheap uranium which would seriously affect the uranium industry and its viability. Today the Energy Department finds that the foreign uranium industry has made substantial inroads into this market. Their report states approximately half of the requirement to be met by imports in 1987.

I believe that is a quote. They have also stated that foreign uranium definitely has a substantial cost advantage over U.S. reserves, yet there is no action, failure to enforce the law as the authors of the policy intended.

Obviously this is my version and my view, and one of the reasons we are having a hearing is to get your views. I find this interesting given the fact that Secretary Hodel has initiated action to protect DOE's enrichment business from cheaper foreign supplies as far as SWU's are concerned, yet DOE which is required under existing statutory authority to maintain a viable uranium industry hasn't done anything.

As a result, we currently have a uranium industry that is in worse shape than it was 3 years ago when we reviewed the issue. Foreign uranium is scheduled to supply an ever-increasing share. This jeopardizes the U.S. uranium viability and, of course, as I see it, and perhaps we will hear something to the contrary, ultimately the U.S. national security interests.

Finally, we are in my opinion wasting a lot of precious time talking about this issue when we ought to be doing something.

With this in mind, I look forward to reviewing with the Energy Department and the Energy Information Administration the study which has been completed. I look forward to discussing with the DOE and the EIA the next steps in the process, and I particularly want to review with them positive steps that would be undertaken to implement the law of maintaining a viable uranium industry.

I close on this note. I am positive that Congress will do something about this if it isn't done under existing law. I do hope we will be able to work something out.

[The report "United States Uranium Mining and Milling Industry—A Comprehensive Review" has been retained in subcommittee files. Following is an excerpt from the report.]

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Dist. Category UC-13

UNITED STATES URANIUM MINING AND MILLING INDUSTRY

A COMPREHENSIVE REVIEW

May 1984

A Report to the Congress
by the President
of the United States

U.S. Department of Energy

TO THE CONGRESS OF THE UNITED STATES:

Pursuant to the requirements set forth in Section 23(a) of P.L. 97-415, the Nuclear Regulatory Commission Authorization Act of 1983, the "Comprehensive Review on the Status of the Domestic Uranium Mining and Milling Industry" is provided to the Congress.

The report presents information on the current and projected status of the domestic uranium mining and milling industry including uranium requirements and inventories, domestic production, import penetration, domestic and foreign ore reserves, exploration expenditures, employment, and capital investment. In addition to presenting projections of industry behavior under current policy, the report provides projections under alternative policy scenarios in the event that foreign import restrictions were enacted by Congress. The anticipated effect of spent nuclear fuel reprocessing on the demand for uranium is also addressed.

RONALD REAGAN

THE WHITE HOUSE,
May 31, 1984.

THE SECRETARY OF ENERGY
WASHINGTON, D.C. 20585

April 25, 1984

MEMORANDUM FOR The President

Attached is a report on a comprehensive review of the domestic uranium mining and milling industry, as required by the Nuclear Regulatory Commission Authorization Act of 1983 (P.L. 97-415, Section 23(a)), and a transmittal letter to the Congress. The law requires that the report be submitted by January 4, 1984. Last July, I informed Senator Domenici (the primary sponsor of the Section 23 legislation) by letter that the report would not be available until mid-April 1984.

The report presents a comprehensive review of the current and projected status of the U.S. uranium mining and milling industry. The subject areas that are specified by the law to be addressed in the review include uranium requirements and inventories, domestic production, import penetration, domestic and foreign ore reserves, exploration expenditures, employment, and capital investment. In addition to presenting projections of industry behavior under current policy, the report presents projections under alternative policy scenarios, in the event that foreign import restrictions were enacted by Congress. The anticipated effect of spent nuclear fuel reprocessing on the demand for uranium is also addressed.

Section 23(b) of the law requires the Secretary of Energy to make a determination of the viability of the U.S. uranium industry each year for the next 10 years, based on a set of specific criteria. These criteria which were established by rule (48 Fed. Reg. 45746 (1983)) after public notice measure the industry's four major attributes--resource capability, supply response capability, financial capability, and import commitment dependency. I will issue the first annual report on this determination later in the year.

To fulfill the requirement of P.L. 97-415, Section 23(a), I recommend that you sign the attached transmittal letter and forward the report to the Congress.

Donald Paul Hodel
DONALD PAUL HODEL

Preface

This report presents the results of a comprehensive review of the status of the U.S. domestic uranium mining and milling industry, conducted pursuant to requirements set forth in Section 23(a) of Public Law 97-415, the Nuclear Regulatory Commission (NRC) Authorization Act, which was enacted on January 4, 1983. The report was prepared in the Energy Information Administration, Nuclear and Alternate Fuels Division, Dr. R. Gene Clark, Director. General questions regarding its contents should be directed to:

Dr. Zdenek D. (Dan) Nikodem
Manager, Uranium Industry Analysis Group
Energy Information Administration, EI-53
U.S. Department of Energy
1000 Independence Avenue, S.W.
Washington, D.C. 20585
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Detailed technical questions should be referred to the following individuals at the above address:

Legislative Requirements	Loretta C. Beaumont
Uranium Resource Statistics	Eugene W. Berkoff Luther L. Smith
Forecasting Methodology and Model Operation	Diane L. Jackson
Uranium Market Activities and Statistics	S. Victoria Krusiewski
Uranium Requirements	Robert W. Moden Elizabeth K. O'Brien
Foreign Uranium Resources and Production	Robert K. Pitman
Uranium Production, Employment, and Capital Expenditures	Laurence R. Sanders

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Executive Summary

This report presents a comprehensive review of the current and projected status of the U.S. uranium mining and milling industry. Section 23(a) of Public Law No. 97-415 requires the President of the United States to submit this one-time review to Congress and, further, specifies some eleven subject areas to be addressed by the review.

Two of these subject areas are, respectively, the level of domestic production and the corresponding percentage of domestic requirements that must be met by domestic production through the year 2000 in order to ensure the viable existence of a domestic uranium industry and the protection of national security interests. These two areas are not definitively addressed in this report, although the adequacy of potential uranium supplies to the United States in the event of a national security emergency was examined -- with the conclusion that domestic requirements could easily be met in the event of such an emergency.

However, Section 23(b) of the law does require the Secretary of Energy to make a determination of the viability of the U.S. uranium industry each year for the next 10 years, based on a set of specific criteria. These criteria which were established by rule, after public notice,[1] measure the industry's four major attributes -- resource capability, supply response capability, financial capability, and import commitment dependency. The status of the industry's viability would be thus assessed far more comprehensively than under the requirement of Section 23(a) described above. The Secretary's first annual report on this determination will be issued later in the year.

As to the current state of the U.S. uranium mining and milling industry, the following conditions exist:

- 1983 production of 10,600 short tons of uranium oxide (U_3O_8)[2] is the lowest level since 1965.
- Only 12 of this country's 23 conventional uranium mills operated during 1983, and these 12 operated at only 58 percent of capacity. The 1983 utilization of the industry's 23-mill capacity was only 33 percent.
- Estimated 1983 surface drilling footage for uranium (3 million feet) was also at its lowest level since 1965.
- Employment, capital investment, and exploration expenditures for 1983 (and the numbers of companies involved in these activities) were the lowest levels recorded over the period in which the Government has collected such statistics, i.e., since 1973.
- Uranium prices for new contracts signed in 1983 were at the lowest level since 1973 (in constant 1983 dollars), continuing the declining trend since 1976. Current new-contract prices are less than one-third of the 1976 peak value.

---

[1] 48 Fed. Reg. 45,746 (1983).

[2] Unless stated otherwise, in this report quantities of uranium are given in short tons U_3O_8; data are reported as of December 31 of each year; and expenditures and prices are given in constant 1983 dollars.

The cause for these conditions has been primarily the slower than anticipated development of the Nation's commercial nuclear power program. Uranium purchase contracts have typically been for long-term delivery, and about 75 percent of U.S. utility industry uranium requirements for the 1983-1992 period were already covered by long-term uranium supply contracts in place at the beginning of 1983. As a result of utilities' contracting for supplies well in excess of realized needs, utility inventories of uranium have increased from about 21,000 short tons U_3O_8 in 1976 to about 69,000 short tons in 1983, which is more than 4 times the utility industry's requirement for 1983, well in excess of their "desired" inventory level of about 1 year's requirement.

In addition to lowering the market demand for uranium to below annual operational requirements, some of this excess utility inventory has entered the marketplace competing with production as a source of supply and reinforcing the downward pressure on new-contract prices.

Because of a Federal restriction on enriching imported uranium for domestic end use,[3] imports of uranium have historically been a small factor in the domestic marketplace. Over the past 7 years, however, as this restriction has been phased out, imports have been increasing gradually. For example, in 1977 only 4.7 percent of the uranium delivered to the U.S. Department of Energy (DOE) enrichment plants by domestic utilities was of foreign origin, although the allowed value was 10 percent. In 1982, when the allowed value was 60 percent, the foreign share increased to 18.1 percent.

With respect to the projected outlook for the U.S. uranium industry under current policy:

- Market demand generally increases each year, rising to about 30,000 short tons U_3O_8 annually by the year 2000, from its 1983 level of about 13,000 short tons.
- Excess utility inventories are worked off or redistributed in the marketplace.
- Market prices for uranium (in constant 1983 dollars) decline or are constant over the next 2 years, with a stronger upward trend beginning in the mid-1980's, leveling off during the early 1990's, and resuming a strong rate of increase during the second half of the 1990's.
- Domestic production, and thus employment, are expected to decline over the next few years before starting a steady increase (about 5 to 6 percent per year) throughout the rest of the century.
- Imports become an increasing factor in the domestic uranium market over the next few years, eventually comprising from 32 to 46 percent of net U.S. supply sources.
- Capital investment and exploration activities remain low during the next few years, followed by steady growth throughout the rest of the century.

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[3] 39 Fed. Reg. 38,016 (1974).

The projections of major characteristics of the U.S. uranium industry thus show that a period of further industry contraction would be followed by a period of steady growth. The growth in nuclear-generated electricity, which is projected to increase almost twofold by the year 2000, would result in a doubling of domestic utility uranium requirements during the same period as the large uranium inventories held by utilities are worked off by the late 1980's.

The remainder of this Executive Summary addresses the eleven mandated subject areas in more detail.

(A) Domestic Utility Requirements and Inventories[4]

Domestic utility requirements are measured by contracted or projected deliveries of uranium to enrichment facilities. These requirements are projected to increase gradually from 1984 through the year 2000. In January 1983, U.S. utilities reported that about 14,000 tons of uranium would be required for delivery to enrichment facilities in 1983. By the year 2000, annual uranium requirements are projected to be about 30,000 tons.

The total inventory of natural and enriched uranium held by utilities at the end of 1982 represented more than 4 years of forward coverage. Assuming a continuation of the current policy of no import restrictions, it is projected that utilities will draw down their inventories, either for their own use or for sale in secondary markets, over the next several years. In the 1990's, inventories are projected to remain at utilities' desired levels, approximating annual requirements.

(B) Domestic Uranium Production

Uranium production in the United States declined during 1983 to about 10,600 tons, continuing the trend of decreasing annual production begun in 1981. This production level was slightly below the amount that producers had contracted to deliver; thus, the difference was made up from drawdowns of producers' stockpiles and purchases by producers on the secondary market. Only 12 of the Nation's 23 conventional mills were in operation at the end of 1983, and the utilization rate at operating mills was about 58 percent of the operative capacity.

The lower than expected demand and low market price for uranium, as projected here, tend to discourage expansion of domestic production capacity over the next 2 years. Production is projected to hold steady or continue to decline through 1985, reaching a low range of 6,000 to 9,500 tons, after which it rises gradually during the rest of this decade and the first half of the 1990's. Thus, over the next several years, domestic production is expected to be below the levels contracted for delivery by producers, as the producers continue to draw down their inventories and buy uranium on the secondary market. During the late 1990's, increasing market demand (in both the U.S. and foreign sectors) and more moderate levels of utility inventories cause prices to escalate, which encourages uranium production to reach a projected level of about 14,000 to 21,000 tons by the year 2000.

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[4] The lettered section headings in this summary correspond to the areas of study mandated in Section 23(a)(2) of Public Law 97-415 (see pages 5-6 of this report).

The slow rate of increase in domestic production projected for the late 1980's is caused by the increasing cost of production and the resulting deterioration in the competitive position of domestic producers in the world market. This is due in large part to the decrease in the grade of ores being mined (or likely to be mined) during the 1980's, the increased depth at which ore deposits are found in the United States, and increasingly stringent State and Federal environmental regulations. At the same time, foreign deposits with ore grades many times higher than those of domestic deposits are being developed and aggressively marketed.

(C) Penetration of the Domestic Uranium Market by Imports

As of January 1, 1983, a total of 44,400 tons of foreign-origin uranium was committed for delivery to the United States from 1983 through the year 2000. This represents about 25 percent of total domestic utilities' forward commitments. During 1982, U.S. companies signed 17 new contracts to import 14,200 tons of uranium for domestic end use. For the most part, foreign producers were the only primary source of uranium capable of offering price terms competitive with the price of uranium being sold from inventories on the secondary market. U.S. producers exported 2,209 tons of natural uranium in 1982 and have committed to export deliveries of 4,500 tons in the period from 1983 to 1991. Currently, there are essentially no commitments for uranium exports in the 1990's. The level of net imports (imports minus exports) in 1983 is estimated at 2,500 tons U_3O_8.

From 1984 to 1988, contracts and options for uranium to be supplied by domestic producers exceed the projected mean level of domestic production, as producers continue to draw down their own inventories and purchase foreign uranium on the "secondary market" as a more economical alternative to production from their own deposits to meet their supply contracts.

In 1987, domestic production is projected to represent 46 to 62 percent of domestic utility market requirements, and import penetration reaches a peak of 41 to 54 percent of utility requirements.[5] By 1990, domestic production is projected to capture 38 to 61 percent of the domestic utility market requirements, while import penetration declines to between 18 and 39 percent. In the 1990's, domestic production is projected to account for an average minimum of 46 percent to an average maximum of 68 percent of utility market requirements, and total net imports are projected to make up about 32 to 46 percent, with currently existing import contracts representing only a small proportion of that total. Thus, penetration of the domestic uranium market by imports reaches its peak in 1987, before dropping to a low point in 1990 and then leveling off through the remainder of the century.

(D) Domestic and Foreign Ore Reserves

Reasonably Assured Resources (RAR), which are customarily called "reserves" in the United States, constitute the most assured sources of future uranium production. The quantities of RAR provide a focal point for companies in making business decisions regarding ongoing mining and milling operations and for planning capital expenditures for expanded or new facilities.

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[5] The low import percentage corresponds to the high domestic production percentage and vice versa. The balance is met by the secondary market and by withdrawals from (or additions to) inventories.

Uranium RAR in the United States at the end of 1983 amounted to 180,000 tons in the \$30 per pound forward cost category[6] and 570,000 tons at \$50 per pound. There have been sharp reductions in U.S. RAR within the \$30 and \$50 per pound forward cost categories over the past 5 years. The major portion of these reductions was not caused by mining or other depletion of the uranium in the ground. Rather, economic factors such as continued inflation and increased environmental and health and safety costs account for the reduction of RAR in the lower forward cost categories.

Foreign uranium RAR are concentrated primarily in Australia, Canada, Namibia, Niger, and South Africa. These countries are the major potential sources of foreign imports to the United States. Uranium RAR in foreign countries at the end of 1982 totaled 1.74 million tons at \$30 per pound and 2.12 million tons at \$50 per pound.

(E) Domestic Uranium Exploration

Drilling to find and develop uranium reserves is the primary indicator of exploration effort. Exploration drilling peaked at 48 million feet in 1978, declined to 28 million feet in 1980, and dropped to about 5 million feet in 1982. Total expenditures for exploration, which include costs for drilling, land acquisition, and overhead and administration, were \$452 million in 1978, \$325 million in 1980, and \$77 million in 1982. Because exploration activity is strongly correlated with expected profits and cash flow, it is not surprising that exploration activity dropped in the early 1980's, when the market price of uranium also dropped. Domestic exploration activity is projected to remain relatively low through the 1980's, then increase gradually through the early 1990's and more rapidly through the late 1990's, reaching \$190 to \$680 million in the year 2000. The projected resurgence of uranium exploration activity is consonant with an escalation in uranium prices necessary to meet the requirements of an assumed growing nuclear power program.

(F) Employment and Capital Investment in the U.S. Uranium Industry

Employment in uranium exploration, mining, and milling reached its highest level in 1979, with about 22,000 person-years of effort expended in the industry. Since that time, employment has declined each year. Because of the substantial layoffs that occurred late in 1982, estimates of 1983 employment reflect a further decline. Because further declines in uranium production and exploration are projected for 1984 and 1985, projections for uranium industry employment in 1984 and 1985 show a continuation of this downward trend, bottoming out at a level between 4,400 and 7,700 person-years. After 1985, a gradual increase in total industry employment is projected, becoming more rapid during the second half of the 1990's and reaching a level between 12,000 and 23,000 person-years by the year 2000.

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[6] "Forward costs," or costs yet to be expended in the production of uranium, have been the basis for estimating RAR. Forward costs are neither the full costs of production nor the market price at which the uranium will be sold. (See Chapter 3 for further discussion of uranium cost categories and reduction of RAR within the various categories.)

Capital expenditures for uranium exploration, mining, and milling have declined markedly since 1980. Total capital expenditures were $949 million in 1980, $461 million in 1981, and $173 million in 1982. Total planned capital expenditures for 1983 amount to $76 million. The downward trend in capital expenditures is projected to continue through the mid-1980's, followed by an upward trend during the rest of the decade and the first half of the 1990's, reaching a level between $350 and $720 million per year in 1995 and 1996 and, continuing the upward trend, increasing to between $350 and $1,120 million per year in the year 2000. The projected level of capital expenditures during most of the rest of this century is low compared to that in the mid-1970's, because not much new capacity is required and, as a result, capital expenditures are made primarily to replace equipment.

(G) Domestic Uranium Production and (H) Domestic Uranium Demand Which Must Be Met by Domestic Production to Ensure a Viable Industry and Protection of National Security Interests

No specific conclusion is reached in this report with respect to a minimum domestic production level necessary for a viable uranium mining and milling industry. The results presented in Chapters 4 and 5 are intended to provide background information upon which decisions affecting the uranium industry can be based. Chapter 5 also contains a brief discussion of the potential impact of a national security emergency on domestic uranium demand and production. As mentioned above, the Secretary of Energy will conduct an annual assessment of the viability of the industry, as required by Section 23(b) of Public Law 97-415. The Secretary's report, which will be released later this year, will assess the industry's viability, as measured by resource capability, supply response capability, financial capability, and import commitment dependency.

In the area of national security, the adequacy of uranium supplies to the United States was assessed, assuming a supply disruption from all sources except Canada. It was concluded that technically feasible U.S. and Canadian uranium production capability would be more than adequate to cover joint U.S.-Canadian requirements, even through the year 2000 if necessary.

This report presents projections of domestic production under current policy and under a variety of optional import policies. The current policy case, or base case, is described briefly in Sections (A) through (F) above, and the optional policy cases in Section (I) below.

(I) Domestic Uranium Production and Price Levels Under Current Policy and Under Assumed Foreign Import Restrictions

Under current policy, the midrange market price projected for new contracts is close to or below $30 per pound of U_3O_8 for each year through 1987, although the market price range (reflecting the uncertainty in projected prices) is about $8 per pound above and below the middle of the range. That projected price is too low to encourage expansion of domestic production capacity, because of the limited amount of uncommitted uranium available for sale by U.S. producers at prices below $30 per pound. After 1990, new contract prices are projected to exceed $40 per pound in the midrange and then to rise steadily through the year 2000. At the low end of the range, prices could remain well below $30 per pound until late in the 1990's; at the high end of the range, prices rise steadily in constant dollar terms, exceeding

$100 per pound in the late 1990's. Domestic uranium production is projected to increase gradually after 1985, reaching 13,000 to 22,000 tons U_3O_8 by the year 2000.

If an assumed import ceiling of 20, 30, or 40 percent of domestic uranium requirements is placed on imports starting in January 1984, the market price for new contracts is projected to rise in each case, relative to the base case. Not surprisingly, the projected effects of the various import restrictions are qualitatively similar but differ in magnitude from case to case. The higher prices projected in these cases lead to increases in domestic production in the late 1980's, relative to the base case.

Import tariffs are another alternative for protecting domestic industries from foreign competition. An import tariff case was examined, assuming a tariff of 25 percent of the purchase price of imported uranium. Under this policy option, the projected effects on market price and production are similar to those in the 20 percent import ceiling case through the 1980's. During the next decade the projected results in the tariff case more closely approximate the 30 percent import ceiling projections.

Even the most stringent of these import controls is not projected to increase retail electricity prices by more than about 2.4 percent, or about 90 cents per month, for an average residential consumer in a utility region heavily dependent on nuclear power. For the Nation as a whole, average electricity prices would increase by less than one-third of this value.

The inclusion of these assumed policies in this review should not be interpreted as an endorsement of their desirability. The particular assumptions were chosen only to illustrate the anticipated general impacts of import restrictions of various classes, as required by Section 23(a).

(J) Anticipated Effect of Spent Nuclear Fuel Reprocessing on Uranium Demand

In this report it is assumed that spent nuclear fuel will not be reprocessed commercially in the United States before the year 2000. However, if a reprocessing capaccity of 500 tons of heavy metal (i.e., spent nuclear fuel) per year were operable in 1992, increasing to 1,500 tons per year by 1994, annual utility requirements for uranium would be reduced significantly. If only uranium were recycled, the average annual fuel requirements from 1994 through the year 2000 would be 10 percent less than they would be in the absence of any reprocessing capacity. If both uranium and plutonium were recycled as reactor fuel, the average annual uranium requirements would be reduced by about 16 percent.

(K) Other Information Relevant to Consideration of Import Restrictions

The demand for uranium depends, in part, on the projected dates for new nuclear reactors to enter commercial operation. Those projections are based on an Energy Information Administration (EIA) review of units that are now under construction or in the licensing process.[7] However, a number of economic, legislative, or regulatory issues could affect the actual dates on which the reactors begin operation.

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[7] See Commercial Nuclear Power: Prospects for the United States and the World, DOE/EIA-0438, November 1983.

Recent announcements have also been made of denials of operating licenses, and nuclear power reactors have been delayed or cancelled, because the high level of demand for electricity anticipated in earlier years has not occurred, the funds necessary to complete the projects have not been available, or the favorable situation for nuclear power in a given case has been reversed. Since the projections of nuclear power capacity used in this analysis were finalized, 10 nuclear reactors representing a total of 10.0 GWe of generating capacity have been cancelled, and 2.2 Gwe have been delayed beyond the year 2000. This represents a 10 percent reduction in estimated nuclear capacity by the year 2000. Utility uranium requirements and inventory levels will be affected by these and any additional cancellations and delays. Ultimately, this would result in a lower level of domestic production and prices than suggested by the analysis presented in this report.

Until recently, the enrichment complex operated by DOE (and its predecessor agencies) was the only source of enrichment services in the free world. However, the U.S. Government monopoly position ended as some foreign countries developed their own enrichment capabilities. Although the availability of foreign enrichment services does not directly affect the domestic demand for uranium (because natural uranium would still be required as feed to enrichment suppliers), the selling of excess enriched uranium stockpiles by some foreign countries could potentially displace a demand for domestic uranium production.

Finally, the new Utility Services enrichment contract issued by DOE on January 18, 1984, which should permit electric utilities to match uranium enrichment requirements more closely with the operational requirements of their reactors, could result in reduced projections of domestic natural uranium requirements. However, since enrichment service customers have until October 1984 to convert to the new contract, its effects on natural uranium requirements could not be evaluated in this review.

Senator **Domenici**. I note that two Senators have arrived. Senator Bingaman, I am delighted that you have joined me today, and if you would comment I would be pleased to hear, we would all be pleased to hear what you have to say.

STATEMENT OF HON. JEFF BINGAMAN, A U.S. SENATOR FROM THE STATE OF NEW MEXICO

Senator **Bingaman**. Senator, I appreciate the invitation to be here.

I notice that there seems to be a discrepancy between the Government, Department of Energy, and the industry as to the present, the prospects that they see for the uranium industry in the future and the problems that I believe need to be addressed, and I am interested in exploring that.

Thank you.

[The prepared statement of Senator Bingaman follows:]

Jeff Bingaman

Statement of Senator Jeff Bingaman
for the
Energy Research - Development Subcommittee
of the Senate Energy and Natural Resource Committee
The Status of the Uranium Industry
September 12, 1984

Mr. Chairman, our nation has long recognized the importance of a viable domestic uranium industry. The industry is important both to our energy independence and our national security. Unfortunately the uranium industry today is more depressed than at any other time in its 30 year history. It is probably the most economically depressed of any of our country's extractive industries.

Seventy-seven percent of the work force is laid off - more than 17,000 employees are out of work. More layoffs are expected in the future. Capital investment and exploration have virtually ceased. Production is the lowest since 1957, and has plummeted dramatically since 1980. There are fewer than 10 of our 23 mills operating, and these are operating only at minimum levels. More cutbacks are expected in New Mexico which is one of the hardest hit states in the country. Current production levels are insufficient to supply even half of the uranium required to fuel U.S. nuclear reactors, and contracts for imported uranium have sored in recent years. It is obvious from these statistics that the industry faces a very uncertain future.

The recent report of the Department of Energy that provides a comprehensive review of the current status of the domestic uranium mining and milling industry does not adequately assess this critical situation or the uncertainty facing the industry in the future. The agency's report is based on misguided and basically incorrect assumptions for future growth in the industry. The report projects a "steady growth" future. It is difficult to comprehend how that optimistic projection of growth can be justified in light of current domestic conditions. Even the Colorado Nuclear Corporation, which devised the model DOE uses for its projection, disagrees with the agency's predictions on almost every issue.

My most serious concern with the report, aside from its inaccurate forecasting. is the lack of attention given to the tremendous impact of imports on the uranium industry. In New Mexico we already have seen the detrimental effects of foreign imports on the state's copper and potash industry. Since 1981 foreign uranium imports have ballooned from 12 percent to 45 percent of contracted supply for delivery in the period 1981-1990. Virtually all new contracts let by U.S. utilities are now with foreign sources. Specifically, there is strong evidence to suggest that the Canadian government is, in effect, subsidizing its uranium industry and is encouraging sales of surplus Canadian uranium at fire-sale prices in the U.S. The Canadian government has provided subsidies in the form of cash, interest-free loans, or other capital infusion during the past few years. Further, Canada requires its nuclear utilities to commit decades in advance to contracts for uranium supplies, often on lucrative terms with Canadian producers.

At the same time, Canadian producers are selling their surplus products in the U.S. market at prices which are a fraction of those charged in Canada. For example, information I have obtained shows that Ontario Hydro, Canada's largest nuclear utility, has signed long term contracts with Canadian producers at $73.40/lb (Cdn.). The prices rise to $81.00/lb. in 1985 and $98/lb. in 1991. In 1984, Canadian companies have sold nearly 2.0 million pounds of uranium on the spot market to U.S. utilities at prices around $18.00/lb. This pricing discrepancy cannot continue unabated. I am interested in knowing what steps the Department has taken to substantiate this information and what recommendations they have made to correct this inequity.

I also am concerned about the regulations the Department issued last October which purport to define viability. These regulations suggest that a viable domestic uranium industry is an industry capable of meeting increases in demand if ther is some unspecified import disruption, taking stockpiles into account. Under the definition, there could be no uranium industry and it would still be viable. Under bankruptcy law and common parlance, "viable" means being capable of paying the bills and producing a reasonable profit. I hope the Department has plans to revise its regulations in the near future to make them a bit more realistic.

I look forward to hearing the testimony of the witnesses. Thank you.

Senator DOMENICI. Thank you very much. Now we will start. Mr. Boggs, do you want to go first? All right. Mr. Boggs, it's nice to have you here.

STATEMENT OF HON. DANNY J. BOGGS, DEPUTY SECRETARY, DEPARTMENT OF ENERGY

Mr. BOGGS. Thank you, Mr. Chairman, members of the committee. I am pleased to testify today on the Department of Energy's efforts in the development of the President's report to Congress entitled, "United States Uranium Mining and Milling Industry: a Comprehensive Review."

I am accompanied by Erich Evered, the Administrator of the Energy Information Administration.

This report presents the results of the Department of Energy review of the status of the domestic uranium industry as required by section 23(a) of the NRC Authorization Act.

In April 1983, Secretary Hodel assigned to EIA responsibility for the data collection and analysis necessary to prepare this mandated one-time report from the President to Congress. I would like to highlight the fact that this one-time report mandated by section 23(a) is independent from the requirement of section 23(b) which requires the Secretary to make a determination of the viability of the U.S. uranium industry each year for the next 10 years.

The criteria for this determination were established by rule after public notice and three public hearings. These criteria measure four industry attributes—resource capability, supply response capability, financial capability, and import commitment dependency. The first annual report, and I emphasize the first annual report on this determination, will be issued by Secretary Hodel later this year. I would like to indicate that in discussing this testimony with the Secretary, he and the Department take this responsibility very seriously, that he shares the concern of the members of this committee that in considering imports of any commodity we must take into account the status of the law and take into account the effects on producers and consumers of any such imports.

We also believe it is a wise policy to have annual determinations of this sort because certainly, as many of the testifiers will indicate, the views as to what the status of the industry is and projections of the future can change quite rapidly, and it is indeed helpful to have hearings such as this so that the Secretary may be able to take the latest information and views into account in making this determination.

Before I discuss the President's report, a brief history of Federal involvement in the uranium industry may be helpful. Before the mid-1960's, the Federal Government was essentially the sole purchaser of uranium primarily for military purposes. As military requirements declined during the 1960's, a major new source of uranium demand emerged—commercial nuclear reactors.

In 1964, the Federal Government was restricted from enriching imported uranium for domestic use, in effect creating an embargo on uranium imports. This restriction was instituted to protect the domestic industry, which developed to serve U.S. defense needs, until commercial nuclear power provided a market to sustain it.

By 1970, all uranium production was purchased by the private sector while the Government satisfied its requirement from accumulated stockpiles.

As the commercial market matured, the embargo on enriching foreign uranium was gradually phased out. Over the past few years, the data in the President's report show that the demand for uranium has declined. Domestic exploration and production are at low levels and prices are below the cost of some domestic production.

The cause of these conditions has been primarily the slower than anticipated development of the Nation's commercial nuclear-power industry. Utilities have found themselves with long-term contracts for uranium supplies that are well in excess of current need. Inventories, therefore, have increased to beyond efficient levels, and some of this excess inventory has entered the market, thereby offsetting production and reinforcing the downward pressure on prices.

According to the EIA analysis, the domestic uranium industry probably will continue to contract for a few more years, reflecting the large inventories of uranium that overhang the market.

Furthermore, production costs are expected to continue to increase due in large part to decreasing ore quality, increasing depths of ore deposits, and increasingly stringent State and Federal environmental regulations.

At the same time, high-quality foreign deposits are being developed and marketed. As commercial demand picks up, however, domestic uranium production is projected to grow at a moderate pace through the end of the century, although not reaching the peak level achieved in 1980.

In conclusion, the President's report is intended as a one-time review of the domestic uranium industry. The information in it is based on historical data. The projections are driven, as are all estimates of the future, by the underlying assumptions. Variations in the future demand for nuclear power, the rate of inventory drawdown, and the response by domestic producers to expected changes in the market price would result in changes in the forecast.

This concludes my prepared statement. I would like to introduce J. Erich Evered, the Administrator of the Energy Information Administration, who will discuss the preparation of the analyses in the report.

[The prepared statement of Mr. Boggs follows:]

PREPARED STATEMENT OF HON. DANNY J. BOGGS, DEPUTY SECRETARY, U.S. DEPARTMENT OF ENERGY

Mr. Chairman, Members of the Committee, I am pleased to testify today on the Department of Energy's efforts in the development of the President's May 31 report to Congress entitled United States' Uranium Mining and Milling Industry: A Comprehensive Review. I am accompanied by J. Erich Evered, Administrator of the Energy Information Administration.

This report presents the results of a Department of Energy review of the status of the domestic uranium mining and milling industry as required by Section 23(a) of P.L. 97-415, the Nuclear Regulatory Commission (NRC) Authorization Act. In April 1983, Secretary Hodel assigned EIA responsibility for the data collection and analysis necessary to prepare the mandated one-time report from the President to the Congress.

If I may digress for a moment, I would like to highlight the fact that this one-time report, mandated by Section 23(a), is independent from the requirements of Section 23(b). Section 23(b) requires the Secretary of Energy to make a determination of the viability of the U.S. uranium industry each year for the next ten years. The criteria for this determination were established by rule (48 Fed. Reg. 45746 (1983)) after public notice and three public hearings. These criteria measure four industry attributes -- resource capability, supply response capability, financial capability, and import commitment dependency. The first annual report on this determination will be issued by Secretary Hodel later this year.

Before I discuss the findings of the President's report, a brief history of Federal involvement in the uranium industry is appropriate. Before the mid-1960's, the Federal government was essentially the sole purchaser of uranium, primarily for military purposes, from the domestic mining and milling industry. As military requirements declined during the 1960's, a major new source of uranium demand emerged -- commercial nuclear power reactors.

In 1964, the Federal government was restricted from enriching imported uranium for domestic use, in effect creating an embargo on uranium imports. This restriction was instituted to protect the domestic industry, which developed to serve U.S. defense needs, until commercial nuclear power provided a market to sustain it. By 1970, all uranium production was purchased by the private sector, while the government satisfied its requirements from accumulated stockpiles. As the commercial market matured, the embargo on enriching foreign uranium was gradually phased out, beginning in 1977.

Over the past few years, the data in the President's report show that the demand for uranium has declined. Domestic exploration and production are at low levels and prices are below the cost of some domestic production.

The cause of these conditions has been primarily the slower than anticipated development of the Nation's commercial nuclear power industry. Utilities have found themselves with long-term contracts for uranium supplies which are well in excess of current needs. Inventories, therefore, have increased to well beyond efficient levels. Some of this excess inventory has entered the market, thereby offsetting production and reinforcing the downward pressure on prices.

According to the EIA analysis, the domestic uranium industry probably will continue to contract for a few more years, reflecting the large inventories of uranium that overhang the market. Furthermore, production costs are expected to continue to increase due in large part to decreasing ore quality, increasing depths of the ore deposits, and increasingly stringent State and Federal environmental regulations. At the same time, high quality foreign deposits are being developed and marketed. As commercial demand picks up, however, domestic uranium production is projected to grow at a moderate pace through the end of the century, although not reaching the peak level achieved in 1980.

In conclusion, the President's report is intended as a one-time review of the domestic uranium industry. The information in it is based on historical data. The projections are driven, as are all estimates of the future, by their underlying assumptions. Variations in the future demand for nuclear power, the rate of uranium inventory drawdown and the response by domestic producers to expected changes in the market price of uranium would result in changes in the forecast.

This concludes my prepared statement. I would now like to introduce J. Erich Evered, the Administrator of the Energy Information Administration, who will discuss the preparation of the analyses in the report.

Senator Domenici. We will proceed then unless Senator Bingaman has a question.

Erich, you may proceed.

STATEMENT OF HON. J. ERICH EVERED, ADMINISTRATOR, ENERGY INFORMATION ADMINISTRATION, DEPARTMENT OF ENERGY; ACCOMPANIED BY DR. R. GENE CLARK, ENERGY INFORMATION ADMINISTRATION

Mr. Evered. Mr. Chairman, in view of the fact that the full prepared testimony has been presented to the committee, I would be pleased to abridge my remarks here.

Mr. Chairman, I am pleased to appear before you today to describe the Energy Information Administration's efforts in the development of the President's report to the Congress of May of this year entitled, "The United States Uranium Mining and Milling Industry: a Comprehensive Review."

I would emphasize, Mr. Chairman, that the report we are discussing is the President's report. It is not DOE's and it is not EIA's.

I am accompanied this afternoon by Dr. Gene Clark, Director of EIA's Nuclear and Alternate Fuels Division. His division prepared the data and analysis for the report we are discussing today.

Senator Domenici. What is the significance of that statement by you that it is Presidential and not—are you suggesting you are not going to be the source of the information?

Mr. Evered. No, sir; in no way do I mean to disclaim the authorship of the analysis backing up the report. I will, later in my remarks, get to the very point you raise.

As the Deputy Secretary has observed, we became involved in this effort in April 1983 when Secretary Hodel assigned the EIA the responsibility for implementing the Department's information collection and data analysis requirements associated with section 23 of Public Law 97-415, of which you are very familiar, of course.

Section 23(a) of that statute mandates a one-time report by the President to the Congress on the current and projected status of the domestic uranium industry.

The historical data presented in the President's report on domestic uranium industry behavior in such areas as the uranium resource base of the United States, exploration, marketing, employment, and capital expenditures, were extracted from annual publications of the EIA and of the former Grand Junction area office of the Department of Energy. In general, this information is supplied by the industry in response to annual surveys of all companies engaged in domestic uranium activities and is a part of the EIA's basic energy information program.

Information on the projected status of the industry was based on the results of EIA's economic model, evaluation of uranium resources and economic analysis, referred to in EIA as the Eureka model. The projections of nuclear-power capacity and utility uranium requirements presented in the report and used in the Eureka quantitative analysis were based on published data and forecasts of the EIA. The Eureka model simulates the decisions that various uranium market participants must make, and does so sequentially on a year-by-year basis. For example, it assumes that uranium buyers enter the marketplace for uranium on the basis of their expected future requirements—expectations that may change over time.

For the initial year of the simulation, the reported utilities' expectations are used. However, as the simulation proceeds through time, these expectations are gradually transformed to different postulated requirements curves.

Although there is no comprehensive world supply and demand balance in this domestic analysis system, it does contain a representation of imports and exports. The first year of the simulation begins with U.S. uranium supply contracts—domestic imports and exports—currently in place. As these supply contracts are annually implemented, certain fractions of the buyers' expected forward requirements are filled. Domestic buyers satisfy their remaining requirements from domestic production available at the current market price, if existing and planned production capacity is projected to be available in that year.

If unsold domestic production capacity is not available, buyers are assumed to contract for imports or deplete their excess inventories. Both domestic and foreign producers compete at the same market price. However, the analysis implies that domestic buyers prefer more secure domestic supplies to less secure foreign supplies.

The supply of imports has an upper limit determined exogenously—that is, outside the Eureka model—in the uranium supply analysis system which, based on production center cost data and demand schedules, balances the world uranium market supply and demand.

In order to account for the impact of uncertainties in the various assumptions used as input to the model, most of the assumptions were specified as ranges and the projections were made by repeatedly running the model, varying each parameter over its feasible range. Consequently, the resulting projections are shown in the report as ranges. The mean values shown in the tables and figures represent the midpoints of the indicated ranges.

During the report development process, draft reports were circulated for review to various offices within the Department of Energy, and to other Federal agencies, including the Departments of State and Commerce, the Office of Management and Budget, and the U.S. Trade Representative.

The review process is routinely employed by the EIA to identify and correct any information gaps, inconsistencies, or technical errors and generally to improve the final report.

More important, as this was a report by the President to the Congress, review and comment by all concerned organizations in the executive branch was appropriate and desirable. The comments and suggestions made by the various reviewers dealt largely with improving the presentation of the information in the report.

The individual results which are presented in the report on historical and projected industry behavior were not changed, nor was the EIA asked to change them, as a result of comments received from outside reviewers.

Again, Mr. Chairman, we are pleased to be here, and we will be happy to answer any questions that you or the other members of the committee may have.

[The prepared statement of Mr. Evered follows:]

Prepared Statement of Hon. J. Erich Evered, Administrator, Energy Information Administration, Department of Energy

Mr. Chairman and members of the Committee, I am pleased to come before you today to describe the Energy Information Administration's efforts in the development of the President's May 31 report to the Congress titled United States Uranium Mining and Milling Industry: A Comprehensive Review.

We became involved in this effort in April 1983 when Secretary Hodel assigned EIA the responsibility for implementing the information collection and data analysis requirements associated with Section 23 of Public Law 97-415. Section 23(a) of that statute mandates a one-time report by the President to the Congress on the current and projected status of the domestic uranium industry.

The President's report presents historical information on the uranium mining and milling industry and projections of industry behavior under current policy, that is, assuming no restrictions on the importation of uranium. Since the legislation called for the analysis of alternative import levels, four alternative policy scenarios are also examined wherein the impacts of import quotas of 20, 30, or 40 percent or of an import tariff of 25 percent are also assessed, in the event that foreign import restrictions were enacted by Congress.

My remarks today will be limited to the procedures by which the data were assembled and analyzed in the report development

PROCESS. THE HISTORICAL DATA WHICH ARE PRESENTED IN THE REPORT ON DOMESTIC URANIUM INDUSTRY BEHAVIOR IN SUCH AREAS AS THE URANIUM RESOURCE BASE IN THE UNITED STATES, EXPLORATION, MARKETING, EMPLOYMENT, AND CAPITAL EXPENDITURES WERE EXTRACTED FROM ANNUAL PUBLICATIONS OF THE EIA AND OF THE FORMER GRAND JUNCTION AREA OFFICE OF THE DEPARTMENT OF ENERGY. IN GENERAL, THIS INFORMATION IS SUPPLIED BY THE INDUSTRY IN RESPONSE TO ANNUAL SURVEYS OF ALL COMPANIES ENGAGED IN DOMESTIC URANIUM ACTIVITIES. THESE SURVEYS ARE CONDUCTED BY THE EIA AS PART OF OUR MANDATE TO MAINTAIN AN UP-TO-DATE, VERIFIABLE ENERGY INFORMATION SYSTEM AND TO PROVIDE DATA AND ANALYSIS UPON WHICH GOVERNMENT, INDUSTRY, AND THE GENERAL PUBLIC CAN BASE THEIR DECISIONS ABOUT ENERGY IN THE ECONOMY.

INFORMATION ON THE PROJECTED STATUS OF THE INDUSTRY WAS BASED ON THE RESULTS OF EIA'S ECONOMIC MODEL, EVALUATION OF URANIUM RESOURCES AND ECONOMIC ANALYSIS, REFERRED TO AS THE EUREKA MODEL. THE PROJECTIONS OF NUCLEAR POWER CAPACITY AND UTILITY URANIUM REQUIREMENTS PRESENTED IN THE REPORT AND USED IN THE EUREKA QUANTITATIVE ANALYSIS SYSTEM WERE BASED ON PUBLISHED DATA AND FORECASTS OF THE EIA.

THE EUREKA MODEL SIMULATES THE DECISIONS THAT VARIOUS URANIUM MARKET PARTICIPANTS MUST MAKE, AND DOES SO SEQUENTIALLY ON A YEAR-BY-YEAR BASIS. FOR EXAMPLE, IT ASSUMES THAT URANIUM BUYERS

ENTER THE MARKETPLACE FOR URANIUM ON THE BASIS OF THEIR EXPECTED FUTURE REQUIREMENTS--EXPECTATIONS THAT MAY CHANGE OVER TIME. FOR THE INITIAL YEAR OF THE SIMULATION, THE REPORTED UTILITIES' EXPECTATIONS ARE USED; HOWEVER, AS THE SIMULATION PROCEEDS, THESE EXPECTATIONS ARE GRADUALLY TRANSFORMED TO DIFFERENT, POSTULATED REQUIREMENTS CURVES.

ALTHOUGH THERE IS NO COMPREHENSIVE WORLD SUPPLY AND DEMAND BALANCE IN THIS DOMESTIC ANALYSIS SYSTEM, IT DOES CONTAIN A REPRESENTATION OF IMPORTS AND EXPORTS. THE FIRST YEAR OF THE SIMULATION BEGINS WITH U.S. URANIUM SUPPLY CONTRACTS (DOMESTIC, IMPORT, AND EXPORT) CURRENTLY IN PLACE. AS THESE SUPPLY CONTRACTS ARE ANNUALLY IMPLEMENTED, CERTAIN FRACTIONS OF BUYERS' EXPECTED FORWARD REQUIREMENTS ARE FILLED. DOMESTIC BUYERS SATISFY THEIR REMAINING REQUIREMENTS FROM DOMESTIC PRODUCTION AVAILABLE AT THE CURRENT MARKET PRICE, IF EXISTING AND PLANNED PRODUCTION CAPACITY IS PROJECTED TO BE AVAILABLE IN THAT YEAR. IF UNSOLD DOMESTIC PRODUCTION CAPACITY IS NOT AVAILABLE, BUYERS ARE ASSUMED TO CONTRACT FOR IMPORTS OR DEPLETE THEIR EXCESS INVENTORIES. BOTH DOMESTIC AND FOREIGN PRODUCERS COMPETE AT THE SAME MARKET PRICE; HOWEVER, THE ANALYSIS IMPLIES THAT DOMESTIC BUYERS PREFER MORE SECURE DOMESTIC SUPPLIES TO LESS SECURE FOREIGN SUPPLIES.

THE SUPPLY OF IMPORTS HAS AN UPPER LIMIT, DETERMINED EXOGENOUSLY (THAT IS, OUTSIDE THE EUREKA MODEL) IN THE URANIUM SUPPLY ANALYSIS

SYSTEM WHICH, BASED ON PRODUCTION CENTER COST DATA AND DEMAND SCHEDULES, BALANCES THE WORLD URANIUM MARKET SUPPLY AND DEMAND.

IN ORDER TO ACCOUNT FOR THE IMPACT OF UNCERTAINTIES IN THE VARIOUS ASSUMPTIONS USED AS INPUT TO THE MODEL, MOST OF THE ASSUMPTIONS WERE SPECIFIED AS RANGES AND THE PROJECTIONS WERE MADE BY REPEATEDLY RUNNING THE MODEL, VARYING EACH PARAMETER OVER ITS FEASIBLE RANGE. CONSEQUENTLY, THE RESULTING PROJECTIONS ARE SHOWN IN THE REPORT AS RANGES. IN EACH CASE, THE INDICATED RANGE OF RESULTS COVERS 95 PERCENT OF THE PROJECTED POSSIBLE VALUES. THE MEAN VALUES SHOWN IN THE TABLES AND FIGURES REPRESENT THE MIDPOINTS OF THE INDICATED RANGES.

DURING THE REPORT DEVELOPMENT PROCESS, DRAFT REPORTS WERE CIRCULATED FOR REVIEW TO VARIOUS OFFICES WITHIN THE DEPARTMENT OF ENERGY AND TO OTHER FEDERAL AGENCIES, INCLUDING THE DEPARTMENTS OF STATE AND COMMERCE, THE OFFICE OF MANAGEMENT AND BUDGET, AND THE U.S. TRADE REPRESENTATIVE. THE REVIEW PROCESS IS ROUTINELY EMPLOYED BY THE EIA TO IDENTIFY AND CORRECT ANY INFORMATION GAPS, INCONSISTENCIES, OR TECHNICAL ERRORS AND GENERALLY TO IMPROVE THE FINAL REPORT.

MORE IMPORTANT, AS THIS WAS A REPORT BY THE PRESIDENT TO THE CONGRESS, REVIEW AND COMMENT BY ALL CONCERNED ORGANIZATIONS IN THE EXECUTIVE BRANCH WAS APPROPRIATE AND DESIRABLE. THE COMMENTS AND

SUGGESTIONS MADE BY THE VARIOUS REVIEWERS DEALT LARGELY WITH IMPROVING THE PRESENTATION OF THE INFORMATION IN THE REPORT. THE INDIVIDUAL RESULTS WHICH ARE PRESENTED IN THE REPORT ON HISTORICAL AND PROJECTED INDUSTRY BEHAVIOR WERE NOT CHANGED, NOR WAS THE EIA ASKED TO CHANGE THEM, AS A RESULT OF COMMENTS RECEIVED FROM OUTSIDE REVIEWERS.

ONCE AGAIN, I AM PLEASED TO HAVE HAD THE OPPORTUNITY TO APPEAR BEFORE YOU TODAY. I WILL BE GLAD TO ANSWER ANY QUESTIONS YOU MAY HAVE ON THE PROCEDURES EMPLOYED BY THE EIA IN DEVELOPING THE DATA AND ANALYSIS FOR THE PRESIDENT'S REPORT ON THE DOMESTIC URANIUM INDUSTRY.

Senator **Domenici**. Thank you very much. Dr. Clark, did you have any testimony or remarks?

Dr. **Clark**. No, Mr. Chairman.

Senator **Domenici**. Senator Bingaman.

Senator **Bingaman**. I had some questions, but whatever order you would like.

Senator **Domenici**. Why don't you go first?

Senator **Bingaman**. Let me ask first of all, I guess I am somewhat puzzled by the second part of your projection. I understand you say in here in your report the projections of major characteristics of the U.S. uranium industry show that a period of future industry contraction would be followed by a period of steady growth, and the period of steady growth, you indicate that imports will become an increasing factor in the domestic uranium market, eventually comprising from 32 to 46 percent of U.S. supply source.

Why does it stop at 32 to 46 percent? Why not 80 percent? What I am basically getting at is I do not see the factors in the projection that would indicate that the U.S. market absent some action by Congress or the Executive, that the U.S. industry can maintain its share of the market even to that extent.

Mr. **Evered**. Senator, I understand your concern. The projection of improving prospects after the next few years is based on our assessment that demand for uranium will grow worldwide and that domestic purchasers of uranium have a preference for U.S. source uranium if it is available at the same price as imports. Therefore, we feel that domestic producers could maintain a substantial market share, as indicated in the report.

Our basis for this expectation is the anticipated growth in demand for uranium, as a function of a growing nuclear power program throughout the world, which is projected to put upward pressure on the market price for uranium. One basic problem domestic producers face right now is an inadequate price. Given a rising price in the future, they will be able to compete head to head with imports and maintain a share of the U.S. uranium market.

Senator **Bingaman**. Let me ask the extent to which the present situation as I understand it, that about 77 percent of the work force is laid off in this country, some 17,000 employees, that really capital investment is at a standstill, and production is low as it has been since 1975—what are the, are there not some initial investments required to once again start up this production which would create a disincentive for U.S. industry to reenter this market and regain a position at some time several years down the road?

I mean are we seeing a situation where the shutdown, the shutdown has a momentum of its own?

Mr. **Evered**. Yes, there will be some costs associated with restarting abandoned operations. These costs are not expected to be so extreme as to have to reexcavate mines entirely, but I don't mean to belittle the fact that there are startup costs to resume operation.

Senator **Bingaman**. Let me ask about Canadian imports just a minute if I could. The information I have is that the Canadian Government is subsidizing its uranium industry and perhaps subsidizing a substantial amount of the uranium coming into this country.

What I would ask is whether that situation left unchecked has been factored into your report in your view?

Mr. **Evered** We do not have such information and have not factored into the report prepared for the President any assumptions about changes in policies with respect to the Canadian Government. We have no evidence of their subsidizing uranium exports, and we would be pleased to see what information has been made available to you so that we can review it ourselves.

Our feeling is that the Canadian producers are selling uranium at the prevailing market price. Perhaps there is some disagreement as to what constitutes government subsidy, and we could discuss that separately.

Senator **Bingaman**. Has there been in your Department an inquiry, an analysis of whether or not there has been a subsidy provided or is presently a subsidy provided by the Canadian Government?

Mr. **Evered**. No, there has not, and I would say that would be more the purview of the Commerce Department than the Energy Department.

Senator **Bingaman**. So your assumption is, as I understand it, that there is no subsidy, I mean in your report you are assuming no subsidy by the Canadian Government for the uranium coming out of Canada?

Mr. **Evered**. We assume neither that there is, nor that there is not, a subsidy. We simply see uranium supplies being imported to the United States at a market price which must be paid by domestic customers.

We do not make a particular assumption that they are being subsidized.

Senator **Bingaman**. But you do not see the question of whether there was a subsidy by the Canadian Government as anything that should be looked into as part of this report?

Mr. **Evered**. We do not see evidence of subsidy taking place.

Senator **Bingaman**. All right, and could you answer the question? I thought the question was do you see that as something that you should, was outside the purview of what you were to look into in this report? I guess that goes without saying.

Mr. **Evered**. Senator, yes, if there were subsidy taking place, it would have an impact on the relative marketability of uranium supplies from various countries. It would have a substantial impact and could be an important consideration in an overall assessment of the outlook for domestic uranium producers, if there is evidence of subsidy by foreign governments.

Senator **Bingaman**. So you are saying that that is one factor that perhaps should be factored into a projection for the U.S. industry that has not been factored into this report?

Mr. **Evered**. Perhaps so, yes.

[Mr. Evered submitted the following:]

I should point out that differences in tax laws among countries is taken into account and, to the extent that different levels of taxation affect relative marketability, these things were taken into account.

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Domenici**. Thank you, Senator Bingaman. Mr. Evered, let me just review with you some thoughts I have.

In 1981, you did a report for this subcommittee which eventually finalized, according to my recollection and what my staff has presented to me, you finalized that in 1983. That report was entitled, World Uranium Supply and Demand, Impact of Federal Policies.

In that report you projected that the level of imports in 1992 would be approximately 40 million pounds. In your present study which is the one you have been describing that will be part of that which will go to the President, you projected imports will be about 15 million pounds in that same year, so if we look at it, just look at this in another way, you predicted in your earlier report that production in the United States in 1992 would be less than 10 million pounds of uranium, but in your more recent one, you predict that production in 1992 by domestic producers will be over 20 million pounds. Your most recent report clearly states that a number of economic indicators for the domestic industry are even lower than when you first reported to this committee 3 years ago—employment lower, exploration lower and down on going through the list.

How do you account for changes in your present study from the previous one?

Mr. EVERED. Mr. Chairman, there has been a great deal more information made available to us in the ensuing 3 years. There is no disagreement, I believe, on the current status of the industry. As I said, those indicators are down and down strongly in some cases.

On the basis of a number of nuclear powerplant cancellations or delays, we have altered our view of what the demand for uranium is going to be.

At the same time, there are major sources of foreign uranium——

Senator DOMENICI. I understand that, but this one, this particular scenario and change in the conclusion is the opposite direction. I mean you have, by 1992 you have things going better in the United States than you did in your previous one, so cancellations wouldn't have an impact on that, would it?

Strike that. I don't know it is better worldwide. I am saying you are saying by 1992 we will use more of American, U.S. uranium than you did in your previous report by a lot, and you also assume less Australian imports than you did.

Mr. EVERED. That is correct.

[Mr. Evered submitted the following:]

However, the 1992 production, projected in the earlier report, was the lowest value over the projection period. By the latter half of the 1990's, our 1981 analysis projected domestic production of about 20 million pounds a year—about one-third of domestic requirements.

Senator DOMENICI. Now I am asking you why?

Mr. EVERED. The Australians have deferred further development of major uranium properties, and the uranium from these properties was not assumed to be available in the President's report, as it was assumed in the earlier report.

[Mr. Evered submitted the following:]

One difficulty in making these production and import projections is that significant shifts can be effected by the cancellation or development of only one or two large projects, as well as by other factors.

Senator DOMENICI. They have deferred it based on what?

Mr. Evered. Political considerations.

Senator Domenici. As a matter of fact, their Labor Party—they have a parliamentary system—is opposed to mining uranium as a matter of policy, is that not correct?

Mr. Evered. That is close to my understanding in a nutshell.

Senator Domenici. Is that one of the reasons that you lowered the Australian estimated imports?

Mr. Evered. Yes.

Senator Domenici. Well, I hate to do this, but isn't that exactly what we were telling you all in 1981 and 1982? That is precisely why we should not let America's uranium industry go down the tube was because Australia was not a reliable supplier?

Mr. Evered. I understant the point you are making, Mr. Chairman, but Australia is not a dominant source of uranium supply to the United States.

Senator Domenici. They are not a dominant source now?

Mr. Evered. No, sir.

Senator Domenici. Wasn't your first report, the earlier of the two that I referred to, weren't they going to be but became less?

Mr. Evered. The chairman is correct.

Senator Domenici. How many reactor cancellations in the United States have occurred since the analysis in your report was completed?

Mr. Evered. If I may refer to our records a moment?

Senator Domenici. Of course.

[Brief pause in the proceedings.]

Senator Domenici. I know the answer, but maybe it is not right.

Mr. Evered. We have an estimate of eight at this point. We don't have a definitive number.

Senator Domenici. We disagree on that, so I don't know the answer. I say between 14 and 16.

Mr. Evered. That could well be, Mr. Chairman, because there have been a number canceled or delayed since the time the information was frozen for the preparation of this report.

[Mr. Evered submitted the following:]

The analysis of the uranium industry, done for the presidential study, was finalized in February 1984, but the projections used for the analysis were based on the status of nuclear power plants at the end of 1982. Since the end of 1982, we believe that 13 nuclear units have been cancelled, as shown in the following table. In addition, 9 units are currently in indefinite status. All but 2 of the cancellations were assumed by the EIA to come online in the 1980's for the President's report.

U.S. NUCLEAR POWER PLANT CANCELLATIONS AND DEFERRALS
SINCE DECEMBER 31, 1982

Unit	Net Design Capacity (GWe)	Percent Completed	Month Cancelled	Location	Year Projected*
1983 Cancellations					
Cherokee 1	1,280	18	April	South Carolina	1997
Clinton 2	950	3	October	Illinois	1998
CRBR	350	1	October	Tennessee	1993
Skagit-Hanford 1	1,277	0	November	Washington	1998
Skagit-Hanford 2	1,277	0	November	Washington	2000
Shearon Harris 2	915	4	December	North Carolina	1996
6 Units	6,049 GWe				
1984 Cancellations (Through 9/24/84)					
River Bend 2	934	1	January	Louisiana	1996
Midland 1	492	84	July	Michigan	1987
Midland 2	818	84	July	Michigan	1986
Yellow Creek 1	1,285	33	August	Mississippi	1997
Yellow Creek 2	1,285	3	August	Mississippi	1999
Hartsville A1	1,205	44	August	Tennessee	1992
Hartsville A2	1,205	34	August	Tennessee	1993
7 Units	7,224 GWe				
Units in Indefinite Status (As of 9/24/84)					
Carroll County 1	1,120	0		Illinois	1998
Carroll County 2	1,120	0		Illinois	2000
Grand Gulf 2	1,250	24		Mississippi	1991
Marble Hill 1	1,130	57		Indiana	1988
Marble Hill 2	1,130	35		Indiana	1991
Seabrook 2	1,198	29		New Hampshire	1991
Zimmer	810	85		Ohio	1986
WNP 1	1,266	63		Washington	1990
WNP 3	1,242	75		Washington	1987
9 Units	10,266 GWe				

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*Year of projected first commercial operation assumed in the President's Report.

Senator **Domenici**. So the demand figures don't take these into account, is that right?

Mr. **Evered**. That is correct.

Senator **Domenici**. So in terms of a potentially healthy outlook by 1992—as I have just gone over with you—you rely upon a demand that is not accurate if my numbers are correct and the facts I have got, and wouldn't it make a significant difference if indeed you had not taken those into consideration?

Mr. **Boggs**. I would note, Mr. Chairman, it certainly would make some differences. It would depend on when the reactors were supposed to come into service.

Certainly if a reactor was supposed to come into service in 1986, and it was canceled, that demand would not be there in 1992.

On the other hand, some of the reactors that have been canceled recently were not due into service up until the nineties, so you would have to look at it year by year, but it certainly would make some difference depending on when they had been scheduled in the analysis.

Senator **Domenici**. You understand why this major change really disturbs this Senator. I mean obviously just about every time we have got you or anyone in the administration to get the analysis to a point where we thought you were going to find nonviability, we find a change. In this case, the change is things are going to get better.

They keep getting worse, but now we have got less imports rather than more, more domestic uranium being sold, more American. It seems to me that we are always getting the bad luck. The facts change just about the time something has to happen that will help us.

You don't think that this report is flawed enough to reconsider it with reference to the demand in the United States? Are you satisfied with the contents at this point?

Mr. **Evered**. Mr. Chairman, I was completely satisfied with the report's contents at the time I approved it for forwarding to the Secretary for ultimate transmittal to the President for delivery to the Congress.

I seldom ascribe much veracity to any forecasting analysis much longer than the ink is wet on the report. Our outlook of the future is not a static phenomenon. As more information becomes available, as we become smarter about how the economy and the industry operate, our outlook for the future changes.

One need only look at our annual forecasting publications for energy in general. Our outlook for a specific future year may change markedly from year to year. As time goes on and more information becomes available, our assumptions change; however, the methodology for forecasting the future does not necessarily change.

Senator **Domenici**. Let me just ask you one last question. Then I will have a couple for the Secretary. Is this correct that your model is such that you could not tell the relative effects of things like pricing and demand and that effect on domestic production?

Let me quote now. It says because the forecasts were in an integrated fashion, it is difficult to ascertain how much correlation there is among projected parameters. I thought in reviewing that, that another way to say that was the model was constructed in a way or at least to some extent in a way that I couldn't ask you the question: what contribution price has in determining future domestic production? Was I wrong?

Was I wrong?

Mr. **Evered**. Mr. Chairman, if I may, I would like to ask Dr. Clark to respond to that.

Senator **Domenici**. Of course; Dr. Clark?

Dr. **Clark**. Mr. Chairman, what we really meant by that section of the report was that it is difficult to present that detailed information on all the vaious relationships among the projected parameters. We do perform analyses and do know what the interrelation are in the modeling system.

However, it is very difficult to present this very complex information in a report like this.

Senator **Domenici**. I understand that when it comes to price it is not like the Administrator's former boss, Senator Bartlett—he was first teaching me about oil production. I understand uranium is not quite as much price related as to supply and demand because at least as far as domestic use, as price has to do with oil in terms of future supply because capital investment is much more significant in this particular kind of thing than the price of uranium, but it does seem to me that it is very important in terms of what the future looks like. Is that not correct?

Dr. **Clark**. Yes, that is correct—very much so.

Senator **Domenici**. Let me ask you about Australia one more time and then I will pass to Secretary Boggs a couple of questions.

What does Australia's policy, in terms of their Government moving kind of with the nuclear, antinuclear winds of our times, do to your assessment of whether we ought to rely significantly upon them in an industry, in the nuclear industry and for uranium for our national security? And if this is for Secretary Boggs—maybe it is.

Now I understand Canada comes into the picture. That is why I am asking the question. Somebody says that. Just give me so I can understand what goes through your head. Let's say if Canada isn't around and we are going to have to rely on Australia. We have got a government over there that goes through an election, elects a parliamentary majority, and the whole leadership right there and their party leaders are not going to mine uranium, are not going to ship it out.

Mr. **Boggs**. Well, if I might, let me make two prefatory statements. The first one is that Secretary Hodel will be issuing a report with a determination of the viability of the industry, and therefore I am fairly well constrained from taking positions that might foreclose his decisions either way on that.

Second, I would also like to say that I am always very uncomfortable about discussing the policies of foreign governments without the assistance of the State Department.

I would say that independent of both of those factors, in making overall energy policy where we wish to maintain and create for Americans adequate supplies of energy at reasonable cost, we have to take into account, just as we do with oil or natural gas, the possible impacts of the policies of foreign countries. Again, just as we do in those other areas, we have to measure and assess the degree of import dependence, the degree of vulnerability, the availability of domestic substitutes and things of that sort; but I would say that the chairman is certainly correct, that in making general energy policy, we have to take into consideration the impact of imports and the stability of imports on domestic producers and consumers.

Senator DOMENICI. Well, I would assume that—the Administrator told Senator Bingaman on one issue it should be the Department of Commerce. You are suggesting we need the State Department? I didn't know we needed all of them or I would have invited them all here, so they will all be part of telling the President, of going over the report before it goes to the President, won't they?

Mr. EVERED. Yes, sir.

Senator DOMENICI. You say that with a smile on your face. Instead of that, I am worried. I would like to have them here before they do that. I wasn't just joking about that.

Let me just proceed. Mr. Secretary, in your testimony you state that the Department—just as they have for some time—you stated that the major factors influencing the domestic uranium increase is a decrease in demand for uranium because of nuclear powerplant cancellations.

Is that true?

Mr. BOGGS. I believe there are two factors. One is a change in the estimate of what will happen in the future in the sense that in some cases, as I understand it, the current demand has continued, but people who had made purchases for the future now will not anticipate converting them into use because that reactor has been canceled, and that led to a buildup of inventory.

So you have two factors. One is the change in inventories over the last several and the next several years, and the second is the change in projected overall demand. Certainly both in the short run and in the long run, those will have an effect on the market and they will have an effect both on the consumption side and on the production side because if the future demand is not going to be there, then some of the production that might have been brought on may not be brought on as well. So all of those factors interrelate.

Senator DOMENICI. Well, then can we say with certainty that the imports are not the substantial cause of why the industry is where it is today, but we cannot continue to hide from the fact that they will be a principal problem in the future? I mean, is that what we end up with—with this kind of an approach?

Mr. BOGGS. I am not sure I entirely understand.

Senator DOMENICI. They are not substantially the cause of problems now, but they will be in the future or they will not? That is, imports, on the status of our industry.

Mr. BOGGS. Well, certainly to the extent that imports may increase in the future, they will increasingly impact on domestic industry. My understanding of the numbers—on which I might stand corrected—is that if there were no imports as of, say, 1983, that that would not restore the production in the industry to anything like its past peaks.

Senator DOMENICI. I understand that. Did you want to say something, Dr. Clark?

Dr. CLARK. No, sir. I was agreeing with Mr. Boggs' statement.

Senator **Domenici**. Let me just move off of that issue for another minute. Then I will be finished. In 1981 the Assistant Secretary for the Department testified here that the Department would not pursue policies which would result in a drawdown of domestic stockpile.

Your new uranium enrichment policies seem to me from what I can tell now to be in contradiction to that. Exercising the split tail option will decrease demand by about 50 million pounds over the next 4 years. Your version of the enrichment contract as it is going to be modified which I don't think you even complied and sent to Congress as required by law, just my own observation, puts a surcharge on the variable tail assays which will decrease demand by 38 million pounds from what we can figure.

Can you explain why the Department feels the need to balance its enrichment costs or its books and bookkeeping in this manner? It just seems to me that is aimed directly at letting the domestic uranium industry pay the tab.

Mr. **Boggs**. Mr. Chairman, I would not personally be able to respond in detail to the figures contained in your question, although I would be happy to provide an answer for the record if that would be helpful.

Senator **Domenici**. Do any of you know the answer to that?

Mr. **Boggs**. I can respond I think, though, to the underlying policy question that you raise. I would basically say that without a viable Government enrichment enterprise in the United States (and certainly that enterprise has been under attack and our activities have been under attack from some in Congress who feel that we should not be continuing a vigorous enrichment business) without that active domestic enrichment business, I don't see how we are going to have in the long run an active domestic uranium mining business because I don't think that we can have a viable domestic industry based on exporting uranium to other countries for enrichment. So while it is certainly possible that as in any relationship between a supplier and a manufacturer there is going to be some friction, and I will be happy to provide for the record a response on the specifics you gave, I think it is important for all of us involved to recognize that these two industries are connected and that they are connected with the viability of the overall nuclear industry in this country which we have also been trying to advance through licensing reform legislation and things of that sort.

Senator **Domenici**. When you answer that with reference to the numbers, and we will supply them to you, the committee would be interested in relating that demand modification that is going to be caused by that reduction in demand to, in some way to the industry itself and its future and supplies in the future. How does it relate to production and/or supplies in the future?

Mr. **Boggs**. We would be happy to try to do that.

[Mr. Boggs submitted the following:]

Without the details supporting the numbers, we are not able to verify the decreased demand figures you have cited. We would note that the decreased demands you have discussed are apparently related to future operation of the enrichment plant rather than today's operation. To shed some light on the discussion, we would like to explain how our operations are being conducted and to discuss qualitatively how these operations affect uranium demand.

During the 1970's, the Government employed two operational procedures, preproduction and split tails operation, to optimize the use of its enrichment facilities and to optimize the use of its surplus uranium inventory.

In the preproduction operation, natural uranium from the Government inventory was fed to the enrichment plants to produce slightly enriched uranium. At the time, the enrichment complex had capacity in excess of annual demand for separative work. In anticipation of when annual demand, based on the nuclear power forecasts of that time, would exceed the capacity of the complex, the preproduced material would be used to fill the demand and delay the need for new enrichment capacity.

The split tails operation was a means to reduce the Government's natural uranium inventory without selling the stockpile in the commercial marketplace. The split tails operation involved a transaction tails assay (0.20 percent U-235) that established the amount of feed to be delivered by the utility and the amount of separative work to be paid for by the utility and an operational tails assay (higher than 0.20 percent U-235) used for actual enrichment plant operations. The Government used its stockpile to supplement the utility uranium feed because more feed and less separative work were required at the operating tails assay than at the transaction tails assay. The Government discontinued its split tails operation in 1978.

In the current enrichment operation, the need to reduce near term program costs has led to a reduction in purchase of electric power needed to operate the enrichment plants. Thus, the current separative work output of the plants is below our annual sales. We are making up the separative work deficit by using the embodied separative work in the slightly enriched uranium stockpile accumulated during the preproduction operation.

The utility delivers a fixed amount of natural uranium feed necessary to receive its enriched uranium product. Our operational method simply substitutes some of our slightly enriched stockpile with its embodied separative work for the natural uranium supplied by the utility so that we make up our annual separative work deficit. The net result is a reduction of the Government's separative work inventory through a reduction in the Government's slightly enriched uranium stockpile and an increase in the

Government's natural uranium stockpile. The Government's stockpile remains the same in total, but the composition is changed. This operational method does not reduce the demand for natural uranium in the marketplace and provides the most cost-effective enrichment operation.

When the Government uses any uranium from its stockpile, Section 161m of the Atomic Energy Act of 1954, as amended, requires that DOE price the uranium to provide reasonable compensation to the Government. This is accomplished by valuing the uranium on the basis of average historical acquisition costs. This valuation is included as a component of the Government's cost for providing separative work and consequently, in the separative work price charged to customers. Assessing a higher value for the uranium would result in our costs exceeding the new Utility Services contract price for separative work.

With respect to future split tails operation, the Department has formulated an option to use its natural uranium stockpile in a split tails mode once again. This option will not be exercised for a period of at least six months or longer. We will certainly continue to explore other options during this time to seek solutions that will have favorable impacts on both our enrichment operations and the domestic mining industry.

Under the new Utility Services contract, first offered in January 1984, our customers can also select a variable tails assay. If these customers select a higher tails assay than our 0.20 percent U-235 reference tails assay, they will purchase less enrichment services. Because we operate on the basis of cost recovery, those customers that select a higher tails assay will pay a higher price to cover the higher average cost associated with the lower separative work production. The choice by the utility of tails assay, and the resulting impact on demand for uranium, will depend upon both our higher average costs of production at the higher tails assay and the price of uranium paid by the utility.

Senator DOMENICI. I think it is a very, very high percentage of the future supplies of the industry.

Now one last area—the Department included Canadian production along with U.S. production in its analysis of whether or not we could stand the uranium embargo, is that correct?

Mr. BOGGS. I have to turn to Mr. Evered on that.

Mr. EVERED. Mr. Chairman, on the narrow point of examining a national security scenario, in the President's report we did assume availability of Canadian uranium supplies.

However, in the Secretary's assessment of the viability of the industry with regard to the various criteria set out by rule, availability of Canadian imports is not necessarily assumed.

Senator DOMENICI. And when it goes to the President it will not be assumed?

Mr. EVERED. The President's report is what was published. What is upcoming is the Secretary's report and assessment of viability.

Senator DOMENICI. All right.

Mr. BOGGS. I would just emphasize that again, Mr. Chairman, I think it is important to clarify that the President's report is a comprehensive review but is not required to, nor in fact does it, come to a particular conclusion, and its facts and its analysis may be subject to criticism from a number of points of view, but it was not required to come to a conclusion on viability.

The Secretary's report, which will be issued before the end of the year as the first annual report, is required to make that determination on viability, and therefore will have in that sense a single answer based upon all of this analysis and of course, subject to qualification in the future annual reports that have been required by the legislation.

Senator DOMENICI. Did you have any further questions?

Senator BINGAMAN. I did have a couple of questions if I could.

On this issue of Canadian contracts, do you have readily available the average price for Canadian contracts in this country? Is that something that you either know or could provide to me?

Mr. EVERED. If we could provide what information we can for the record, Senator—we do not have available prices specific to the Canadian imports. We have average prices for all imports at this point.

Senator BINGAMAN. But you don't have average import prices for Canadian imports?

Mr. EVERED. We do not publish that information, but we will provide it for the record.

[Mr. Evered submitted the following:]

EIA preliminary data show that the average base price of U.S. contracts signed with Canadian uranium suppliers during the first half of 1984 (for delivery in 1984 and beyond) was about $19.50 per pound of U_3O_8. The average delivered price of Canadian uranium in the United States during this same period was about $23.00 per pound of U_3O_8. The average delivered price includes deliveries from long-term contract commitments made in previous years.

Senator BINGAMAN. If you could also provide me with any information you have about the price of Canadian contracts with various Canadian utilities to the extent that—I don't know if that is information you also are not——

Mr. **Evered**. Senator, that is information to which we are not privy.

Senator **Bingaman**. OK. Let me ask on this viability issue, I don't know all the history of it, but I gather that the definition of viability that you put out in your regulations is one which has been criticized by the industry very significantly or substantially in that it conceives of a viable domestic uranium industry as an industry capable of meeting increases in demand if there is some unspecified import disruption after you take stockpiles into account. That is my understanding of your definition.

Maybe you could comment as to whether that is an accurate understanding, and also whether there are any thoughts within the Department of revising that definition.

Mr. **Evered**. That in a nutshell is a fairly accurate reflection of the viability criteria. The criteria are not under active consideration for revision.

[Mr. Evered submitted the following:]

However, one of the four major criteria is based on our level of uranium import commitment dependency rather than on any import supply disruption.

Senator **Bingaman**. Thank you, Mr. Chairman.

Senator **Domenici**. Well, let me, before we leave the Government witnesses and start with the others, let me just take a little bit of time with the two of you for 1 minute and we will get on with the other witnesses.

I want to thank you for participating, and I understand and hope you understand that this is a very serious issue to me and to my State and to many other States and to Senator Bingaman obviously, so let me outline a few things that I think we might do and a few thoughts I have.

It seems clear to me that the condition of the industry could not get much worse. I thought that 3 years ago when we held hearings on the issue. I thought we hit rock bottom. Unfortunately, from everything you have said and what the industry will say, it seems clear that the demand is weak, imports are up, and therefore there is little incentive left for most domestic producers to remain in business.

Given the reduction in nuclear development in the United States, the uranium industry is in for some tough times, and DOE's enrichment policies which while designed to solve some problems, and I don't deny that, you state they will solve some, create some others, maybe even created more.

The President's report calls into question whether we can accurately assess this industry on information which is not grossly out of date on its publication or in some way very, very flexible. I don't understand why projections vary so dramatically, but I trust that the followup report will address these issues and have more credibility because of some consistency will be added to the valuation.

I think it is important, too, that we have this hearing today because the problems that we are having in resolving the issues, we have heard testimony from you and will hear some more shortly from all of those involved in industry which says that the Department of Energy is to blame for implementing policies that directly and negatively impact.

While I have been critical today, I want you to know that I honestly believe the truth is somewhere in the middle between the two extremes, so I would like very much to have an opportunity to see if we can't work together on some of these problems, and I am willing to give it a try.

I have asked that the Secretary of Energy and the Trade Representative or some of their staffs start meeting with some of ours. I will ask Senator Bingaman to join to see if we could make some sense out of this and perhaps come down somewhere in the middle.

We will organize the meeting and try to sit down and talk together. We will learn today some additional things. Obviously that kind of meeting should discuss a lot of things that we haven't talked about here, and we can probably do some of those before the afternoon gets behind us. The variable tail surcharge, selling of the stockpile, foreign energy trade policies that result in dumping, some foreign cheap uranium on a limited market, select those selections, we will try to work on some of those together and see if we can come up with some common ground.

Again, I want to thank you for your testimony and the work you have done, and clearly the committee does not need your presence. I know you are busy. If you care to stay, it's fine. We understand at this point, and we do have some additional witnesses to handle here.

Did you have anything, Senator?

Senator BINGAMAN. No, sir.

Senator DOMENICI. Thank you all three very much.

Mr. EVERED. Thank you, Mr. Chairman.

Senator DOMENICI. All right. Let's go with the public witnesses. One panel we have—the president, Western Nuclear, Donald Rausch; Bill Stevens from Quivira Mining, Oklahoma City; Mr. William Alesio, vice president, Umetco Minerals. Will those people please begin to take the table here? Eugene Lang, Robert Luke, Nolan Hancock, Ian Ritchie—do you all have any preference based upon sequence or any problem we have with time, or does it matter?

Let's just start right on our right here. Mr. Rausch, you go first, and we will go right down the line.

May we have order, please. Now for all the witnesses, your prepared statement will be made a part of the record. You are at liberty to read them or assume we will have access and summarize, but in any event, because of time, we need for them to be brief, so Mr. Rausch, will you proceed?

STATEMENT OF DONALD O. RAUSCH, PRESIDENT, WESTERN NUCLEAR, INC., LAKEWOOD, CO

Mr. RAUSCH. Mr. Chairman, members of the committee, my name is Donald O. Rausch. I am president of Western Nuclear, and with me today in the audience are Grey Bogden and Randy Sabo.

Mr. Chairman, I wish to begin by thanking you as well as other members of the committee on behalf of my company and our employees for your interest, concern and effort to restore and maintain a viable uranium industry.

The U.S. uranium industry is severely depressed. In January 1981, this country had 24 licensed uranium mills with a capacity for processing over 53,000 tons of ore per day. Only seven of these mills remain in operation today, with a total capacity of a little over 23,000 tons per day—only about half of this capacity is used.

Overall industry utilization is about 20 percent. Industrial employment has nosedived from 22,000 to less than 6,000, and since 1981 my company alone has laid off over 1,000 employees. Further cutbacks are taking place almost on a daily basis.

What is the cause of the collapse? The two factors which we believe the most important, critical, are one, the importation of low-priced subsidized foreign uranium, and two, DOE nuclear fuel practices.

The first and most important factor confronting the domestic industry today is the flood of subsidized imports of uranium. Since 1981, foreign uranium imports have ballooned from 12 percent to 45 percent of the contracted supply for delivery in the period 1981 to 1990. Virtually all new contracts let by U.S. utilities are for foreign uranium. We estimate that foreign imports will soon be in excess of 50 percent of the contracted supply.

Colorado Nuclear Corp. projects that imports will continue and will capture up from 60 to 80 percent in just a few years of the market. In the first 6 months of 1984 alone, my company estimates that purchases from foreign sources of spot market uranium and long-term supplies are in excess of 7½ million pounds.

DOE appears to take the position that flood of imports is acceptable regardless of whether it closes domestic mines and mills and results in widespread unemployment.

It is important to recognize that our industry must compete with companies owned, subsidized, or protected by foreign governments. A prime example is Canada. One of the principal Canadian companies is Eldorado Nuclear, a Federal crown corporation. Another is Saskatchewan Mining Development Corp. which is owned by the Province of Saskatchewan. Various companies, Canadian companies, have received more than $2 billion worth of Government subsidies in the form of cash, interest-free loans, or other capital infusions during the past few years.

Canada requires its nuclear utilities to commit decades in advance to contracts for uranium supplies. The contracts are at high prices, and the Canadian Government appears to allocate these deals among the various Canadian producers to assure all are underwritten with a share of the lucrative terms of the contract.

More specifically, documents filed with the Ontario Energy Commission indicate that Ontario Hydro, the Canadians' largest nuclear utility, has signed long-term contracts in recent years with Canadian producers totaling $9.4 billion.

The delivery price of the Canadian uranium to Ontario Hydro this year is $73.40 per pound Canadian. The price rises to $81 in 1985, and $98 in 1990. At the same time, the Canadian Government has actively encouraged Canadian producers to sell their surplus production on the U.S. market at prices which are a fraction of what they receive in Canada.

In 1984, Canadian companies have sold nearly 2 million pounds of uranium on the spot market to the U.S. utilities at prices around

$18 a pound. SNDC recently concluded its fourth sale since June to a U.S. utility at such a price.

One further remark is that some of this material was actually borrowed from TVA at 6-percent interest, then sold to the American utilities to raise capital to finance their mining operations of Canada.

The problem is not limited to the Government of Canada, but it includes France, Italy, Spain, and others. This low-price subsidized competition from foreign producers and their government is especially unfair in view of the fact that many governments refuse to permit their countries to purchase U.S. uranium, countries such as France and Canada.

Our second major area of concern is DOE's nuclear-power policies. These policies have significantly reduced uranium demand. These are included in my full statement. I won't go through them.

DOE now faces competition from foreign governments supported enrichment facilities abroad. Moreover, the Department enrichment enterprise is saddled with the multibillion-dollar capital expenditure and billion-dollar charges from TVA for unused electricity.

In the meantime, foreign interests are selling their surplus uranium and enriched uranium on the U.S. market at increasing levels. DOE has undertaken steps to salvage what it can of its enrichment business. This is perfectly understandable.

The problem, however, is that much of DOE's salvaging operations has been at the expense of the domestic mining industry. DOE's response is centered on its new utility service enrichment contract. The new contract allows utilities to purchase up to 30 percent of their enriched uranium from foreign sources on the secondary market. This not only reduces demand for domestic uranium in the near term, but also affords DOE an avenue to sell enriched uranium from its inventory. If these DOE uranium sales occur, we understand that they will be at about $61 per SWU.

Domestic uranium producers cannot compete with such pricing of DOE inventory. In addition to sales of enriched material, DOE is reportedly contemplating sales of its natural uranium inventory. Between 1972 and 1980, DOE sold 60 million pounds of stockpiled uranium through the split tails program—60 million pounds, through the split tails program. The agency has an additional 40 million pounds available for sale.

We think that any sale of stockpiled uranium is ill advised. DOE recently devalued its uranium inventory to $9 a pound, which is not only less than the market price but is far below the average domestic cost of production.

We cannot compete with such sales from our own Government. The General Accounting Office has criticized sales of the stockpiled uranium at below market price as contrary to section 161(m) of the Atomic Energy Act. We believe that DOE's $9 per pound price for the stockpiled uranium and its split tails program seriously harm domestic producers, despite the intent of section 161(m).

Another feature of the new enrichment contract which suppresses uranium demand are DOE penalties on utilities wishing to increase the tails assay of their uranium feed delivered for enrichment. These DOE penalties cost U.S. producers several million pounds of sales each year.

Mr. Chairman, section 161(v) of the Atomic Energy Act directed DOE to adopt enrichment policies which assure the maintenance of a viable domestic uranium industry. There are two important reasons for section 161(v).

First, the DOE is exclusive provider of enrichment services in the United States. Section 161(v) responded to DOE's market power by providing that this power should not be abused with respect to the domestic mining industry.

Second, Congress has long recognized that a viable domestic uranium industry is an integral part of the nuclear-fuel cycle, that it is vital to our national security, and that it is essential to our energy independence.

Senator DOMENICI. Mr. Rausch, we have to——

Mr. RAUSCH. I have got about one more.

Senator DOMENICI. Because we can't each take that long or you will be talking without Senators.

Mr. RAUSCH. I'm sorry. OK. What should be done——

Senator DOMENICI. That is not all that bad says Senator Simpson. When did you arrive? Go ahead.

Mr. RAUSCH. What should be done, one, sales and distribution of uranium from the Government's stockpiles must be stopped.

Two, utility customers must be permitted to select the optional mix of domestic uranium and enrichment services.

Three, adequate measures must be taken to assure the maintenance of a viable domestic industry as required in section 161(v).

We recommend an import quota of no greater than 10 percent.

Thank you.

[The prepared statement of Mr. Rausch and a submittal from Mr. Evered follow:]

Testimony of Donald O. Rausch
on behalf of Western Nuclear, Inc.
for the
Energy Research and Development Subcommittee
of the Senate Energy and Natural Resources Committee

The Status
# of the Domestic Uranium Industry

September 12, 1984

Mr. Chairman and members of the Committee, my name is Donald O. Rausch. I am President of Western Nuclear, Inc. With me today are Grey Bogden and Randy Sabo. Western Nuclear owns and operates uranium mines and mills in the States of Wyoming and Washington. Western also operates jointly-owned uranium mines in the Ambrosia Lake area of New Mexico and has a major interest in an in situ uranium mine under development in Texas. Mr. Chairman, I wish to begin by thanking you, as well as the other members of the Committee, on behalf of my Company and our employees for your interest, concern and efforts to restore and maintain a viable domestic uranium industry. We truly welcome your support and assistance.

The United States uranium industry is severely depressed. In January 1981 this country had 24 licensed uranium mills with a capacity for processing 53,700 tons of ore per day. Only 7 of these mills remain in operation today, with a total capacity of 23,550 tons per day. Only about half of this capacity is in use. Overall industry utilization is about 20%. Industry employment has nose-dived from 22,000 to less than 6,000. Since 1981, my Company alone has laid off 1,000 employees. Further cutbacks are rumored in the industry. Townships and communities in uranium producing areas are on the verge of defaulting on bonds. The industry is clearly at its lowest point since its inception.

The Cause

What has caused this collapse? Among the culprits cited are slower than expected growth in electrical demand and delays in the construction and licensing of nuclear power plants in this country. These factors have certainly not helped the situation. There are, however, two factors which we believe are much more critical to the continued survival of a uranium industry in this Country. These factors are (1) the importation of low-priced subsidized foreign uranium and (2) DOE nuclear fuel policies.

Foreign-Source Uranium

The first and most important factor confronting the domestic uranium industry today is a flood of subsidized imports of foreign uranium. Since 1981 foreign uranium imports have ballooned from 12% to 45% of contracted supply for delivery in the 1981-1990 period. Virtually all new contracts let by U.S. utilities are with foreign sources. Domestic producers are being forced to close their mines and supply foreign uranium through market purchases in order to stay in business.

We estimate that foreign imports will soon be in excess of 50% of contracted supply. Colorado Nuclear Corporation projects that imports will capture 60 to 80% in a few years.[1/] In the first six months of 1983 alone, my Company estimates that purchases from foreign sources of spot market and long-term uranium supplies were excess of 7.5 million pounds.

DOE appears to take the position this flood of imports is acceptable regardless of whether it closes domestic mines and mills and results in widespread unemployment. In correspondence with me, DOE in essence has defined a viable domestic uranium industry as whatever, if anything, is left after unlimited imports have captured much of the U.S. market.

[1/] CNC, Review and Critque of "United States Mining and Milling Industry: A Comprehensive Review" (September 1984)

It is important to recognize that our industry must compete with companies owned, subsidized or protected by foreign governments. A prime example is Canada. One of the principal Canadian companies is Eldorado Nuclear -- a Canadian Federal Crown Corporation. Another is Saskatchewan Mining Development Corporation which is owned by the province of Saskatchewan. These two companies have received more than $1.0 billion worth of government subsidies in the form of cash, interest-free loans, or other capital infusions during the past few years. Even privately-owned Canadian companies have received enormous infusions of cash from the Canadian or provincial governments in one form or another.

Canada requires its nuclear utilities to commit decades in advance to contracts for uranium supplies. These contracts are at high prices and the Canadian government appears to allocate these deals among Canadian producers to assure all are underwritten with a share on lucrative terms. More specifically, documents filed with the Ontario Energy Commission indicate that Ontario Hydro, Canada's largest nuclear utility, has signed long-term contracts in recent years with Canadian producers totalling $9.4 billion. The delivery price of Canadian uranium to Ontario Hydro this year is $73.40/lb. (Cdn.). The price rises to $81.00/lb. in 1985 and $98.00/lb. in 1990.

At the same time, the Canadian government is actively encouraging Canadian producers to sell their surplus production on the U.S. market at prices which are a fraction of those charged in Canada. In 1984 Canadian companies have sold nearly 2.0 million pounds of uranium on the spot market to U.S. utilities at prices around $18.00/lb. SMDC recently concluded its fourth sale since June to a U.S. utility at such a price.[2]

The problem is not limited to the Government of Canada. Two other government-owned entities -- AGIP of Italy and Enusa of Spain -- are selling massive amounts of uranium in the U.S. at low prices. The French government runs the French uranium industry (and the industries of several producers in Africa) through Cogema. In 1981 Cogema purchased Pathfinder Mines Corporation in part to obtain an American foothold under which to sell its uranium and to further expand the foreign share of the U.S. market.

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[2] "Florida Power & Light to Buy SMDC's U_3O_8," Nuclear Fuel, August 27, 1984.

U.S. Producers Barred from Foreign Markets

This low-priced, subsidized competition from foreign producers and their governments is all the more unfair in view of the fact that many governments refuse to permit their countries to purchase U.S. uranium. More specifically, France has stated it will not buy U.S. uranium unless our government modifies its reprocessing policy. Under present policy, a foreign entity buying U.S. origin uranium and wishing to reprocess the spent fuel must obtain State Department approval. Many foreign countries object to this policy and have retaliated against U.S. uranium producers by refusing to consider the purchase of U.S. origin uranium. Canada obtains all its uranium supply needs solely from Canadian producers.

DOE Nuclear Fuel Policies

Our second major area of concern is DOE's nuclear fuel policies. These policies have significantly reduced uranium demand. In order to appreciate the serious adverse impact of these policies, it is important first to review some history.

DOE's predecessor, the Atomic Energy Commission, held a worldwide monopoly in enrichment until the mid-1970's. In early 1970's the Commission projected an enormous expansion in nuclear generating capacity with an accompanying spiral in uranium demand. The Commission therefore took a number of ill-advised steps.

First, the Commission removed pre-exisitng restrictions on importation of foreign uranium for domestic end-use.

Second, the Commission demanded that its enrichment customers sign enrichment contracts 10 years in advance of need.

Third, the Commission "closed" its order books, encouraging foreign governments to develop their own competitive enrichment plants.

Fourth, the Commission embarked on a costly thirteen billion dollar program to upgrade its existing gaseous diffusion enrichment plants and to build a new gas centrifuge enrichment plant in Ohio. The Commission also signed costly electricity supply contracts with TVA.

The expansion in nuclear generating capacity forecast by the Commission and many others did not materialize. Indeed, the last U.S. reactor order was in 1978. The government's forecasts were in fact off about ten- fold.[3] DOE now faces competition from foreign government supported enrichment facilities abroad. Moreover, the Department's enrichment enterprise is saddled with multibillion dollar capital expenditures and billion dollar charges from TVA for unused electricity. In the meantime, foreign interests are selling their surplus uranium and enriched uranium on the U.S. market at increasing levels. DOE has undertaken steps to salvage what it can of its enrichment business. This is perfectly understandable. The problem, however, is that much of DOE's salvaging operation has been at the expense of the domestic uranium industry.

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[3] See Uranium Enrichment: Heading for the Abyss, 221 Science 730, 731 (1983).

DOE's response is centered on its new Utility Services enrichment contract. The new contract allows utilities to purchase up to 30% of their enriched uranium from foreign sources or on the secondary market. This not only reduces demand for domestic uranium in the near term but also affords DOE an avenue to sell enriched uranium from its inventory. If these DOE uranium sales occur, we understand that they will be at $61.00 per SWU. Domestic uranium producers cannot compete with such pricing of DOE inventory.

In addition to sales of enriched material, DOE is reportedly contemplating sales of its natural uranium inventory. Between 1972 and 1980 DOE sold 60 million pounds of stockpile uranium through the "Split Tails" program. The agency has an additional 40 million pounds available for sale. Given the enormous unemployment already extant in the uranium industry, we think that any sale of stockpile uranium is ill-advised. DOE recently devalued its uranium inventory to $9.00 per pound which is not only less than the market price, but also is far below the average domestic cost of production. We cannot "compete" with such sales from our own government. The General Accounting Office has criticized sales of stockpile uranium at below-market prices as contrary to Section 161(m) of the Atomic Energy Act. We believe DOE's $9.00 per pound price for stockpile uranium and its split-tails program seriously harm domestic producers, despite the intent of Section 161(m).

Another feature of the new enrichment contract which suppresses uranium demand are DOE penalties on utilities wishing to increase the tails assay on their uranium feed delivered for enrichment. Under the new contract any customer wishing to increase the tails assay from 0.2% is penalized. But for the penalties, free market forces would lead a DOE customer to buy less enrichment from DOE and deliver more uranium for enrichment. For example, at today's Spot Market price of $17.50 per pound a utility would opt for a 0.33 tails assay which would require the utility to buy 25% more uranium and purchase 25% less enrichment. As uranium prices rise, the tails assay would decrease to an optimum economic level. DOE's penalties cost U.S. producers several million pounds of sales each year.

Section 161(v)

Mr. Chairman, Section 161(v) of the Atomic Energy Act directs DOE to adopt enrichment policies which assure the maintenance of a viable domestic uranium industry. There are two important reasons for Section 161(v). First, DOE is the exclusive provider of enrichment services in the United States. It enjoys enormous market power in the nuclear fuel area. To a large extent, the agency's enrichment policies dictate not only the well-being but the survival of the private companies which make up our country's uranium industry. Section 161(v) and related provisions in the Atomic Energy Act respond to DOE's market power by providing that this power should not be abused with respect to domestic uranium. Since the antitrust laws do not apply to DOE, the domestic industry obviously needs such assurance in order to continue to do business.

Second, Congress has long recognized that a viable domestic uranium industry is an integral part of the nuclear fuel cycle, that it is vital to our national security, and that it is essential to our energy independence. In response to this recognition, Section 161(v) directs that DOE take appropriate measures to maintain a viable industry. The conditions rendering the domestic uranium industry important to the United States have not changed so as to now render that industry expendable.

What Should Be Done?

Action is urgently required to prevent the collapse of America's uranium industry. There are a number of steps which are vital and which should be taken as soon as possible.

1. Sales and distribution of uranium from the government inventory must be stopped.
2. Utility customers must be permitted to select the optimal mix of domestic uranium and enrichment services.
3. Adequate measures must be taken to assure the maintenance of a viable domestic uranium industry as required by Section 161(v) and in order to counterbalance the unfair competition which our industry faces. We believe that a limitation on imports of foreign source uranium to a level no greater than 10% of U.S. demand would be a proper action for our government to take.

Conclusion

Mr. Chairman, I wish to close by expressing again my appreciation, and the appreciation of my Company and its employees and their families, for your efforts and the efforts of your colleagues to assure the maintenance of a viable domestic uranium industry. We look forward to working closely with you in the months ahead. Thank you.

Department of Energy
Washington, D.C. 20585

SEP 21 1984

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
  Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

Enclosed for your information is my response to Donald O. Rausch, President of Western Nuclear, Inc., addressing his concerns about the Department of Energy's domestic uranium industry analysis program. Many of the same concerns, expressed in Dr. Rausch's August 27, 1984, letter to Secretary of Energy Donald Paul Hodel, were raised at your Committee hearing of September 12, 1984, on the President's report to the Congress titled United States Uranium Mining and Milling Industry: A Comprehensive Review.

Sincerely,

Albert H. [illegible]
for J. Erich Evered
Administrator
Energy Information Administration

cc: Honorable Wendell H. Ford
Ranking Minority Member
Honorable Jeff Bingaman
Honorable Alan K. Simpson
Honorable John W. Warner

COPY

Department of Energy
Washington, D.C. 20585

SEP 21 1984

Dr. Donald O. Rausch
President
Western Nuclear, Incorporated
134 Union Boulevard
Lakewood, Colorado 80228

Dear Dr. Rausch:

Thank you for your August 27, 1984, letter to the Secretary of Energy, Donald Paul Hodel, expressing your concerns about the Department's domestic uranium industry analysis program. Your observations, as an active participant in the uranium industry, are appreciated. In your letter, you detail four specific areas of concern. I would like to address these concerns in the order presented in your letter.

1. Concern: The projections in the President's May 31, 1984, Report to the Congress, titled United States Uranium Mining and Milling Industry: A Comprehensive Review, are based on incorrect assumptions and methodology.

   Response: The assumptions upon which the projections in the President's report are based are detailed in Chapter 1 of the report. These assumptions are consistent with the historical data on the industry collected and published by the Department of Energy (DOE) and its predecessor agencies and with official DOE forecasts of uranium requirements published by the Energy Information Administration (EIA). The historical data have been provided, in response to periodic surveys of the industry, by all domestic companies engaged in uranium commerce, including your own.

   It is important to clarify that the report states that a steady increase in domestic production is projected to begin in 1986, but this projected recovery is slow because of the eroding competitive position of U.S. producers in the world market. Part of the reason we project increasing domestic production in the 1990's is due to our expectation of increasing foreign market demand, following a projected fairly steady level during the rest of the 1980's. (See Figure 3, page 15, of the enclosed Presidential report.) This increasing foreign demand, if realized, would absorb some of the increasing foreign supply or, alternatively, provide a market for U.S. production.

I think our uranium marketing survey data (except for the year 1983) support your contention that most of the uranium newly committed to U.S. buyers in recent years is of foreign origin. This is entirely consistent with both the data and the projections of the President's report. Figure 12 on page 53 of the report illustrates our expectation that, under current policy, there would be no net increases in domestic-origin contracts through 1988, but a doubling of foreign-origin contracts in this period. Indeed, foreign-origin deliveries from new (i.e., signed after January 1, 1984) contracts are projected to exceed deliveries from new domestic contracts until 1994.

2. Concern: The Department of Energy's final viability criteria seem to prejudice any determination made under them in favor of a finding of viability.

Response: In developing the final rule promulgating the criteria upon which the annual assessment of the domestic uranium mining and milling industry is to be based, a great deal of effort was made to ensure reasonable and objective measures and to review and consider carefully all comments received on the proposed rule.

These criteria establish measures of industry capability in four areas--resource capability, supply response capability, financial capability, and import commitment dependency. As you point out, the industry's ability to respond to hypothetical supply disruptions will be examined as part of the analysis. In response to several comments on the proposed rule suggesting that the proposed approach to assessing viability was too narrow, "total utility requirements" was replaced by "uranium supply security requirements" which was determined to be a more appropriate measure and consistent with examining the entire range of potential eventualities. At one end of the range of possible import supply disruptions is a total disruption, which is the equivalent to the U.S. uranium industry's supplying all U.S. requirements.

I should also point out that one of the industry's attributes--import commitment dependency--is never tied to responding to an import supply disruption. Import commitment dependency is based upon current import contracts and projected import levels as a percent of annual requirements and is not related to any disruption scenario.

Thus, the final viability criteria are a reasonable modification and logical outgrowth of the proposed rule. These criteria are responsive to many comments publicly provided during the comment period by several different groups and individuals.

Secondly, your statement about the Canadian government agreeing to supply U.S. uranium needs during any supply disruption reflects a misunderstanding about what the Federal Government refers to as a national security emergency. The section in the President's report titled National Security Emergency (page 64) is premised on a condition of national mobilization and military conflict. Under such a condition, an existing agreement between the United States and Canada (referenced at the bottom of page 64 of the President's report) would take effect.

The final criteria, as discussed above, do not presuppose a national security emergency, but rather a more general condition of unavailability of some fraction of import supplies. Under a given import supply disruption scenario, for the purpose of applying uranium industry viability criteria, we do not assume that Canadian (or any other foreign) uranium supplies will fill the void left by the disruption.

3. Concern: Industry's views have not been solicited on the data and other information upon which the viability determination will be based.

   Response: As I stated in response to your first concern, the historical data upon which the viability analysis will be based have been provided by domestic companies engaged in uranium marketing activity. The DOE has considered the question of industry review, and on the advice of the Department's Office of General Counsel, has decided that nongovernment review is inadvisable. Briefly, General Counsel's concerns center around the issue of releasing pre-decisional documents to the public. Documents used in the government decisionmaking process are exempt from disclosure to the public under the provisions of the Freedom of Information Act. This provision of the law is intended to ensure the full and frank exchange the of ideas within the government deliberative process.

4. Concern: The DOE enrichment split-tails program tends to reduce the demand for domestic uranium.

   Response: The following response has been provided by the DOE Office of Uranium Enrichment:

   In answer to your fourth point on split tails operation, in the past the government used this method of operation to utilize its surplus inventory and not compete with domestic uranium producers. This method of operation was discussed during congressional hearings in March 1972, and Congress had no objection to the operation. For the future, we intend to continue this consistent Departmental policy of not releasing any of our uranium into the marketplace in competition with private suppliers.

   However, in order to save budget costs, electric power purchases to operate the gaseous diffusion plants have been reduced, thus reducing the separative work output of the plants to a point lower than our annual sales. In order to provide the enriched uranium required by our customers, enriched uranium from DOE's stockpile must be used and is taken from some of the material produced previously during split tails operation.

   When uranium is sold from stockpile that was produced as a result of split tails operations, Section 161m of the Atomic Energy Act of 1954, as amended, requires that DOE price the uranium to provide reasonable compensation to the government. This can be accomplished by pricing the uranium on the basis of average historical acquisition costs, which is $26.00 per kilogram of contained uranium in the form of UF$_6$ or about $9 per pound U$_3O_8$ for the contained natural uranium. However, since split tails operation in no way affects the uranium marketplace (the customer delivers to us the same amount of feed), this charge does not affect the domestic uranium production industry.

Your comments and concerns are being taken into consideration in the development of the Secretary of Energy's 1984 viability assessment report. If we can be of further assistance in answering any questions you may have on the President's report or about the final viability criteria, please contact R. Gene Clark, Director of the EIA's Nuclear and Alternate Fuels Division, on (202)252-6363. Questions on the Department's enrichment program should be directed to David Thomas in the DOE Office of Uranium Enrichment. He can be reached on (301)353-5944.

Sincerely,

(Signed) Albert H. Linden, Jr.
J. Erich Evered
Administrator
Energy Information Administration

Enclosure

cc: The Secretary
Deputy Secretary

Senator DOMENICI. Thank you very much. Mr. Bill Stevens—perhaps before you proceed we would recognize Senator Simpson.

Senator, we had the Government's witnesses here for the first hour. Obviously if there is any questions that you have of them that were not asked, we would be delighted to submit them for the record.

Before we proceed now with the remaining witnesses, did you care to comment at this time?

STATEMENT OF HON. ALAN K. SIMPSON, A U.S. SENATOR FROM THE STATE OF WYOMING

Senator SIMPSON. Mr. Chairman, I just want to thank you for your dogged persistence in this area. People just don't seem to understand really the criticality of this.

I know in this place we always use that as part of our bag of arrows, but without what you are doing it really portends that. Just because we are dealing with Canada and Australia in the future, that we have a domestic uranium industry, that is not what we had in mind.

You are extraordinary in, as I say, your persistence. I would like the questions that I have be directed to the administration officials entered into the record, and would ask that they respond in writing at an appropriate time that you might set, but I greatly admire you. You have been the strapper in this one.[1]

Senator DOMENICI. Thank you very much, Senator.

Now Mr. Stevens, will you go ahead, please?

STATEMENT OF BILL STEVENS, PRESIDENT, QUIVIRA MINING CO., OKLAHOMA CITY, OK, ON BEHALF OF THE AMERICAN MINING CONGRESS

Mr. STEVENS. Mr. Chairman, my name is Bill Stevens, and I am president of the Quivira Mining Co. It was formerly the Quivira Nuclear Corp., and with me at the table is Rob Luke, executive vice president of this same group who will make some comments specifically about Sequoyah, but I am here essentially, Mr. Chairman, as chairman of the Uranium Policy Council of the American Mining Congress, which as you know is a trade association which represents most of the people involved in the uranium mining and milling.

The AMC, Mr. Chairman, as a consequence of the Presidential report, prepared a lengthy analysis, and in addition to that, we have had an organization, Colorado Nuclear Corp., also look at this and tell us their thoughts about the results of this particular model used in forecasting the future of the industry.

Colorado Nuclear Corp. has a particular expertise involved in this model in that they initially developed the machine. All of this, of course, copies of these things have been made available to your committee.

I would like to make three major points, Mr. Chairman. One of them is that the domestic uranium industry has to be in the worse shape it has been in since it began 30, 35 years ago. You can see that by just simply walking all through the areas where the uranium mining takes place; 80 percent of the work force is laid off. Most mines and mills are closed, and those that are operating are hanging on by the skin of their teeth.

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[1] See appendix I.

The second point, our friends in the Department of Energy in their recent report which projects steady growth for our industry after a short period of time remaining in the basement, has to be inaccurate and certainly misleading to anyone who happens to read the thing.

The DOE has again come through and generated an extremely overly optimistic report for the future of this industry and the future policies that need to be put in place to maintain the industry itself.

Third point, DOE continues to fail to address this problem of viability. The regulations that they proposed and issued in late last fall of last year in response to your requirements to us, to the members of this industry, they have completely misconstrued what viability really is.

I thought I used to have a general idea of what viability might be, but I don't think I would recognize it if I saw it laying out in the middle of the street any more.

There is no way, Mr. Chairman, that you can say that this industry is viable today. I have been involved in it a long time, and never have I seen anything close to its condition.

In the interest of the comments, and I think a lot of us have the same comments, Mr. Chairman, I would very quickly, though, like to take about 5 minutes and show you some charts that I think explain a lot of our problem, and perhaps cut short a bunch of words if I might.

Senator **Domenici**. Great. Proceed.

Mr. **Stevens** [showing charts]. These charts very quickly outline some of the major problems that we will all be addressing here. The first chart reflects historically the uranium production beginning in 1977 and ending in 1984, and it is very obvious that our highlight in this industry certainly is not these days. It was in the latter part of the seventies as everyone generally knows, but the fact remains overall uranium production in 1984 based on what we predict will be the case has fallen 60 to 65 percent from what it was back in the late seventies.

The same is true in the employment in the industry. Back again in the late seventies, 1978, 1979, we had over 20,000 people employed in the industry. The guess now is maybe between 3,000 and 4,000 people—a fall again of about 80 percent.

The same sort of an historical look at the capital expenditures, back again in the late seventies, annual expenditures approaching in excess of $1 billion, and in 1984 perhaps $60 million will be spent capitalwise, or a decrease of about 95 percent.

Another indicator of the status of the industry is the exploration work that is being done, in this case noted as surface drilling, and again the same sort of thing. Back in the late seventies they were drilling 45 to 50 million feet a year for drill hole. Now in 1984 it will have fallen about 90 percent from its high.

I might say, Mr. Chairman, that these two particular aspects, the capital investment and the activity going on to explore for new deposits, are real good indicators of the health of the industry. They have to be done before new projects can be brought on.

One of the aspects I think that is important to show is the DOE's capability to forecast, and I want to point out this is not just really a problem of the DOE. They are more visible perhaps. We all make forecasts and none of us do very good at it, but the problem is that nobody pays much attention to my forecast, but they do to DOE's, and I think historically when you look back at how they were looking at what the expansion of the uranium industry and the nuclear industry was going to be back in 1975, we were talking about millions of pounds of requirements of uranium; 165, 170 million pounds a year.it was going to build up to back then.

Then later on about the same time in 1974, 1977, each year the future looks a little more depressing. The problem, what I said about DOE, things happen as a consequence of DOE's forecast. Very serious things happen.

Back in here, Senator Domenici, the DOE was forecasting all of these tremendous needs for uranium. They also happened to have the enrichment facilities and they were involved, rightfully so, in requiring utilities to sign up for long-term enrichment contracts. The utilities had to have uranium to feed those enrichment contracts with so everybody really got completely crazy about seeking sources of supplies of uranium, and there isn't any question that this was one of the causes of the uranium price to get up into the plus $40 in the late seventies, and also the fact that today we have a huge surplus of material that in turn has caused the market price to be way lower than it has any reason to be. We have all these surpluses.

The present Presidential report we are talking about lies here, and the relationship—I don't know. The relationship is plus 30 million pounds a year versus 180 million pounds back 7 and 8 years ago.

You made the remark earlier, Senator, in these hearings about a report that had come out last year from DOE and the differences in what that report was reflecting in the future and what they present in the Presidential report. This says a couple of things. One of them has to do with what the uranium production requirements, domestic requirements, would be. This is the one from last year, last spring I believe. It shows this dark red figure substantially reduced requirement for uranium particularly out in the late eighties and nineties.

This particular curve here comes from the Presidential report which shows all kinds of great things going on rather than that reduced output requirement.

The same thing, same two reports. This is the imports that they anticipate would come in. This again is the import figure from last year's study which gets up to plus 40 million pounds a year. For some reason or other now, things look rosy, and we have dropped way off to less than half of that figure. In the meantime, in the period of things that has happened during these two reports, it is terribly difficult to reflect what is causing all those things to happen.

In the course of looking at the Presidential report I stated earlier we had Colorado Nuclear Corp. run some figures using the basic figures that DOE had used but put a little different interpretation on them in this same model, and this reflects the uranium demand in this country based on the Presidential report which as you can see back in 1985 the uranium demand will be between 35 and 40 million pounds, and then they show a substantial increase up to plus 60 million pounds as you approach the year 2000, but Colorado Corp. when they look at this thing using the same basic data, they come out with a figure like this that shows a slight increase as we head toward the year 2000 but dropping off out here essentially because they feel that the fuel will be much more economically and more efficiently used during the latter part of the year, and I need to point out that one of the reasons for this vast difference as it was mentioned earlier, that Colorado Corp. used the latter information as far as the plants that have been canceled and all this sort of thing that EIA did not use.

The same sort of thing, the Colorado Corp.'s look at imports as compared with EIA, and again a huge increase reflecting a substantial growth in imports over this same period of time, 1985 through the year 2000, as compared to the DOE's report here, about half again. The imports here approach 80 percent of the total usage at this time.

One last chart, Mr. Chairman—this again reflects all these things boiled back to how much domestic production could we anticipate under these situations, and again, the Presidential report shows a huge increase in domestic production to meet these requirements going from a present 16 million pounds up to in excess of 36 million pounds as compared with Colorado Corp. dropping down to something in the order of 4, 5 million pounds, and the reason for this difference, of course, is the role that, the primary reason is the role that imports play.

Mr. Chairman, I would like very much to, well, we can go right along here, but Rob Luke will make some comments about Sequoyah.

[The prepared statement of Mr. Stevens follows:]

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PRESIDENT

Testimony
on behalf of the
American Mining Congress
on DOE's Report entitled
"United States Uranium Mining and Milling Industry:
A Comprehensive Review" (May 1984)
and Related Issues
September 1984
for the
Energy Research and Development Subcommittee
of the Senate Energy and Natural Resources Committee

Mr. Chairman and members of the Committee, my name is Bill Stevens. I am President of Quivira Mining Company, which owns and operates the Nation's largest uranium mill, as well as a complex of underground uranium mines, in northwest New Mexico. I am also Chairman of the Uranium Policy Council of the American Mining Congress, a trade association which includes most of the companies involved in the country's uranium industry. I am testifying here today on behalf of the American Mining Congress.

Mr. Chairman, the American Mining Congress has serious reservations about the May 1984 DOE Report entitled "United States Uranium Mining and Milling Industry: A Comprehensive Review." Before turning to these reservations, let me first note our one point of agreement.

Current Status of Industry

We agree with the Report insofar as it suggests the sorry state of the industry in 1983. As the Report indicates, 1983 production was 10,600 short tons of uranium oxide -- the lowest level since 1965. The industry operated at only 33 percent capacity. Employment, capital investment, and exploration were at their lowest levels since statistics have been kept. Uranium prices were at their lowest levels since 1973 and current new product prices are less than one-third of the 1976 peak level.1/

We would emphasize, however, that conditions have worsened considerably from the situation reported in the Report. 1984 production is expected to be only about 7,500 short tons, the lowest level since at least 1957.2/ There are now only nine operating mills, none operating at capacity, and further cutbacks are slated.3/ Indeed, given reports out of Wyoming and New Mexico, production next year will likely be no greater than 5,000 tons and the bulk of this will be byproduct from

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1/ US DOE, United States Uranium Mining and Milling Industry: A Comprehensive Review xiii (May 1984) (sometimes referred to as the "President's Report").

2/ The amount produced is less than half the amount of uranium necessary to fuel U.S. domestic reactors.

3/ Nuclear Fuel, July 30, 1984, at p. 3 (Union Carbide announces plans for halt of Colorado uranium operations due to escalating imports).

phosphate operations or uranium from solution mining activities. More than 17,000 workers have been laid off. This is 77 percent of the domestic work force, a tragically high figure in the sparsely populated areas of the West where uranium is mined. More layoffs are expected.4/ In the meantime, foreign utilities and foreign producers -- most of whom are owned or otherwise financed by foreign governments -- are dumping unprecedented amounts of uranium on the U.S. domestic market at cut-rate prices. Importation of foreign-source uranium has continued and commitments for future imports have increased dramatically.5/ The dramatic increase in import commitments is

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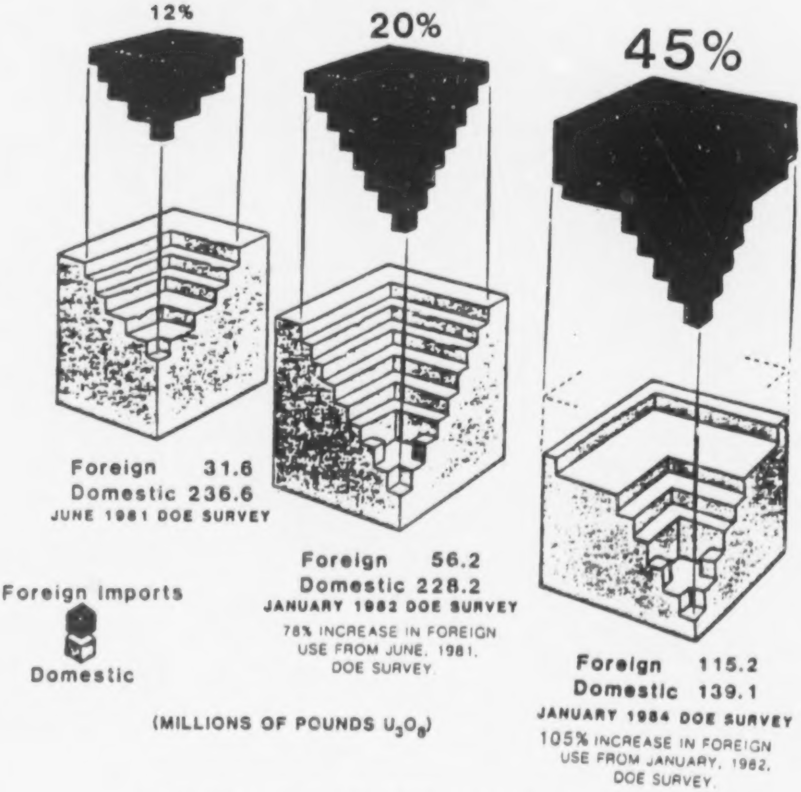
4/ The dramatic deterioration in U.S. uranium production, employment in the U.S. uranium industry, capital expenditures, and surface drilling (exploration) are graphically represented in the charts attached as Appendix A.

5/ The spiralling growth of commitments for foreign source uranium for domestic end-use and the corresponding decrease in commitments for domestic uranium is perhaps the single most important statistic for gauging the future condition of the domestic uranium industry. DOE unfortunately totally ignores this statistic. Instead, the agency concentrates on historical data bearing on past imports, which data is frequently presented in a misleading fashion. For example, in order to minimize the magnitude of the import problem, DOE emphasizes the amount of foreign uranium actually supplied by customers to the agency's facilities for enrichment for domestic end-use. However, this ignores the large amount of foreign uranium oxide entering the "pipeline" in this country. DOE in compiling or presenting its data also sometimes attempts to ignore or obscure imports by producers, equipment manufacturers (e.g., Westinghouse), and other brokers. Another source of confusion arises from "loans" of uranium to foreign interests. For example, the Tennessee Valley Authority "loaned" a Canadian producer over 1,760,000 pounds of uranium in 1983. Although such transactions reduce the amount of Canadian uranium imported into the United States in 1983, they will result in increased deliveries later.

illustrated in the following chart:

INCREASES IN FOREIGN URANIUM IMPORTS
AS PERCENTAGE OF
CONTRACTED SUPPLIES
AUGUST, 1984
FOR DELIVERY 1981 THRU 1990



URANIUM IMPORTS HAVE INCREASED 265% SINCE JUNE 1981

Capital investment and exploration are virtually nonexistent. The price for uranium has declined even further from its depressed levels in 1983 to about $17 today.6/ Mr. Chairman, the average full cost of conventional production in the United States is estimated to be about $30 per pound -- almost twice the price level.7/

The collapse of our domestic industry is well-illustrated by a chart prepared by Colorado Nuclear Corporation.8/ This chart portrays in relative terms the recent nose dive in investment, exploration, employment, production, and price in the U.S. uranium industry.

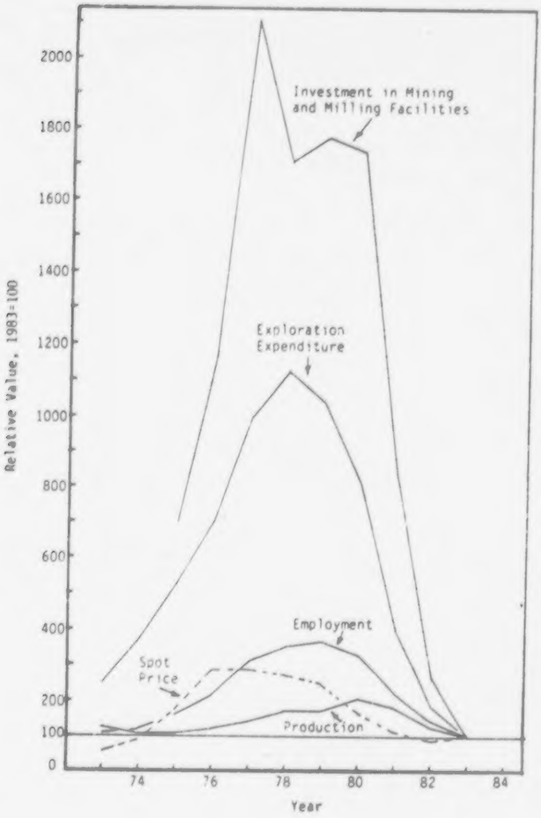
6/ Nuexco exchange value as of July 31, 1984.

7/ This figure is based on a survey of the domestic uranium industry conducted by outside legal counsel for the American Mining Congress (AMC).

8/ CNC, Review and Critique of "United States Uranium Mining and Milling Industry -- A Comprehensive Review." Fig. 2.2 (August 1984). (*See* Appendix D).

Historic Performance of Key Business Parameters

Uranium Industry



It has been my misfortune as a president of a uranium-producing company to have to "layoff" hundreds of employees in New Mexico and Wyoming and to terminate, suspend or cutback innumerable uranium projects. I can state unequivocally that the picture for the industry, its employees, and the local communities which depend upon it is disastrous.

Problems with DOE Projections

Our principal concern with the Report lies in the projections and forecasts which it presents. We believe that the projections and forecasts in the Report are overly optimistic.[9] They are at best highly questionable and at worst seriously flawed.

There are three basic problems with the input data for DOE's projections. The first problem is that in contrast to the actual 1983 statistics of the industry, DOE projections are based on 1982 data. This is evidently because 1982 data was the latest "official" information available from DOE at the time the Report was prepared. The domestic industry deteriorated significantly between 1982 and 1983, and it is in even worse shape now. Use of out-of-date 1982 data rather than the current information results in overly optimistic forecasts of the industry's future.

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[9] DOE and its predecessors have a long tradition of overprojecting demand for nuclear fuel. For the benefit of the record, we have appended an analysis of DOE projections as Appendix B.

The second basic problem is that many of the "inputs" embody subjective judgments on the part of the agency. DOE's inputs relating to U.S. and foreign ore reserves and costs are prime examples. DOE's "guesstimates" for unknown input variables and the agency's subjective quantifications produce overly optimistic projections of the domestic uranium industry's future.10/

The third point to note is that there is a fundamental flaw in the projections contained in DOE's study in that DOE based its projections on a capacity of some 130.6 Gigawatts of nuclear electrical power in the year 2000. This was the latest "official" projection available when the May 1984 Report was prepared.11/ But DOE notes in its Report that since the 130.6 Gigwawatt projection was made, 10 nuclear plants were cancelled.12/ The 130.6 number is thus inflated by DOE's own admission. Moreover, ten more plants have been cancelled in the three months since the Report was issued. More may yet be

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10/ The AMC survey, supra note 7, indicates that DOE has significantly misstated reserve figures.

11/ See United States Uranium Mining and Milling Industry: A Comprehensive Review 4 (May 1984).

12/ United States Uranium Mining and Milling Industry: A Comprehensive Review xx (May 1984).

cancelled. Colorado Nuclear Corporation estimates that total nuclear electric capacity will vary between 89 and 103 Gigawatts in the year 2000.13/ This is 20 to 30% less than EPA's optimistic figure. Even if all reactors now under construction and not yet cancelled are completed, no more than 111.6 Gigawatts of nuclear generating capacity can be on line in the year 2000.14/ In a speech last year, Secretary Hodel admitted that DOE "is not able to make forecasts"15/ of this nature. That admission is well-taken here. DOE's overstatement of nuclear generating capacity seriously undercuts all of the projections and forecasts in its Report.

Thumbnail Critique of DOE's Key Projections

We obviously do not have time to go through DOE's Report in detail. An initial point to note is that DOE projects such a broad range of future possibilities that its projections are useless as a decision-making tool. For example, the agency

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13/ CNC, *supra*, note 8, at Figure 3.2.2-1 and Table 3.2.2-2. CNC observes that the nuclear electric capacity given by DOE in its May 1984 Report is higher than DOE gives in its 1983 Annual Enrichment Report and in the 1983 Energy Review.

14/ Nukem July 1984 Market Report. *See also* S.M. Stoller Corporation, Notes on President's Report on the U.S. Uranium Mining and Milling Industry at 4 (July 1984). (*See* Appendix C).

15/ Secretary of Energy Donald Hodel, "Electricity: the Global Context," at a conference held by Americans for Energy Independence, June 3, 1983.

projects that imports will be anywhere from 30% to 80% of demand. In order to give some focus to the catch-all projections that make up the bulk of the Report, we have focused on what appear to be "average" projections which DOE derives from its data. These projections are found on the page numbered roman numeral 14 in the Executive Summary of the Report.16/ We summarize below some of our views concerning DOE's key projections.

First, DOE projects a market demand for uranium of 30,000 short tons annually by the year 2000. This is erroneous. Nukem forecasts actual demand, given reactor cancellations, to be only 19,000 short tons annually -- about 37% less than that estimated by DOE.17/ Colorado Nuclear Corporaton projects a mean demand of about 16,000 short tons -- almost 50% less than the DOE figure.18/ DOE's error with respect to market demand is alone serious enough to eviscerate the utility and reliability of the May 1984 Report.

Second, DOE projects imports to become an "increasing factor" in the domestic uranium market, comprising 32 to 46 percent of supply. Given (among other things) the more limited demand for uranium, the percentage of imports would appear to be about double

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16/ United States Uranium Mining and Milling Industry: A Comprehensive Review xiv (May 1984).

17/ Nukem July 1984 Report.

18/ CNC, supra note 8, at Figure 3.2.4-1.

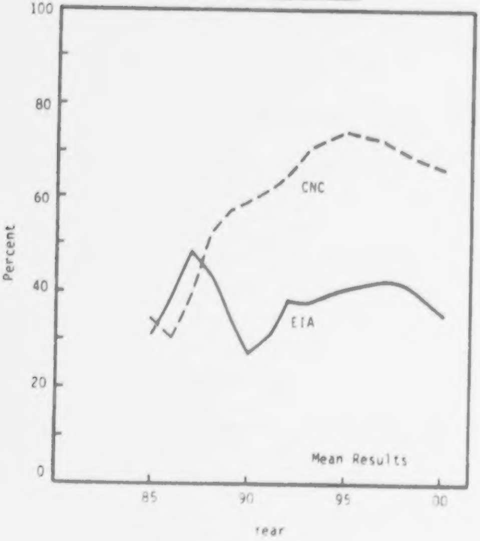
that forecast by the agency. In confirmation, Colorado Nuclear Corporation projects an import percentage of 60 to 80%.19/ The difference is illustrated in the figure below.

19/ CNC, supra note 8, at Figure 4.7-2.

Projected Importation of Uranium

EIA and CNC

Percent of Total Demand

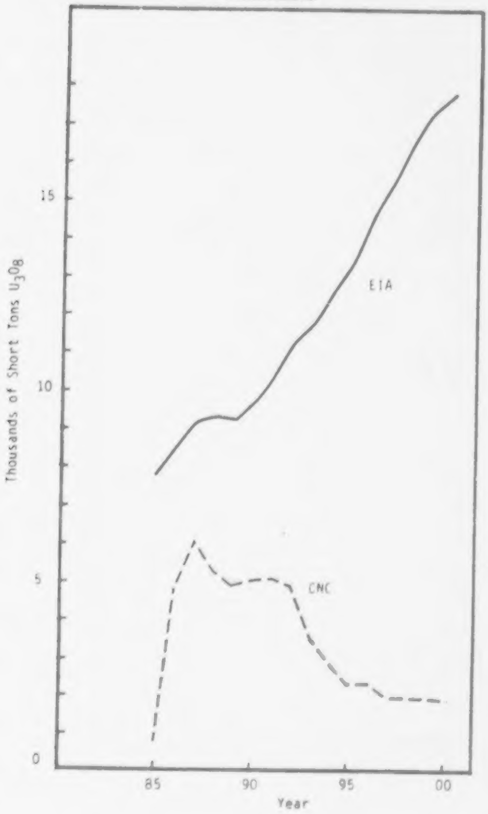


Third, DOE projects a short-term decline in production and employment but then a "steady increase." Given the expected overall usage for uranium, the maximum demand for domestic uranium will be in the 9,000 to 16,000 tons per year range in the year 2000. This is significantly less than the amount projected by DOE. The true amount may well be substantially less, particularly if the percentage of imports is greater than the "average" estimate forecast by DOE.

Colorado Nuclear Corporation (CNC) -- which devised the Eureka model on which DOE's May 1984 Report is based -- analyzed DOE's Report on behalf of the American Mining Congress. In contrast to DOE, CNC projects a relatively steady decrease in U.S. domestic production to only 4 million pounds by the year 2000.20/ The Figure below dramatically illustrates the magnitude of DOE's forecasting error.

20/ See CNC, supra note 8, at p. 29 and Figure 4.9. S.M. Stoller Corporation, a consulting organization retained by a group of utilities, similarly believes that the May 1984 Report overstates future domestic uranium production levels. See Stoller "Notes", appended as Appendix C.

Projected Annual Demand for Domestic Production
EIA and CNC



In short, Colorado Nuclear Corporation forecasts a pessimistic future for U.S. uranium production.21/ The difference with DOE's glowing projection could not be more striking.

Fourth, DOE projects market prices being stagnant for the next two years, followed by an upward trend. More particularly, DOE forecasts a price of $20.20 to $20.50 per pound for 1984-85. It is now September and the market price is only slightly above $17.00.22/ In short, DOE's projections are already overly optimistic after only a few months. It is likely that DOE's estimates of future prices are also excessive. Even if DOE's estimates of the future were correct, the prices forecast by DOE do not reach a level sufficient to cover domestic costs until the 1990's. By that time, Mr. Chairman, the domestic industry will be skeletal.

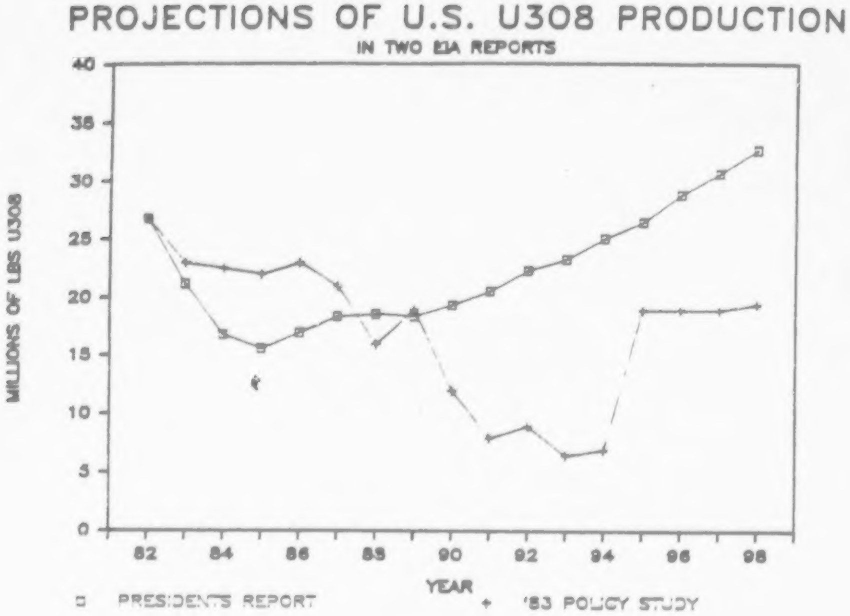
Fifth, DOE projects "steady growth" in capital expenditure. Capital expenditure in uranium is currently virtually non-existent. Exploration is similarly cut to the bone. It is not clear why anyone would spend any significant sum in an industry which even under DOE's rosy estimates for demand will not break even for years. DOE's "steady growth" prognosis falls along with the agency's faulty forecast of 30,000 tons annual demand.

21/ The entire CNC report is appended as Appendix D.

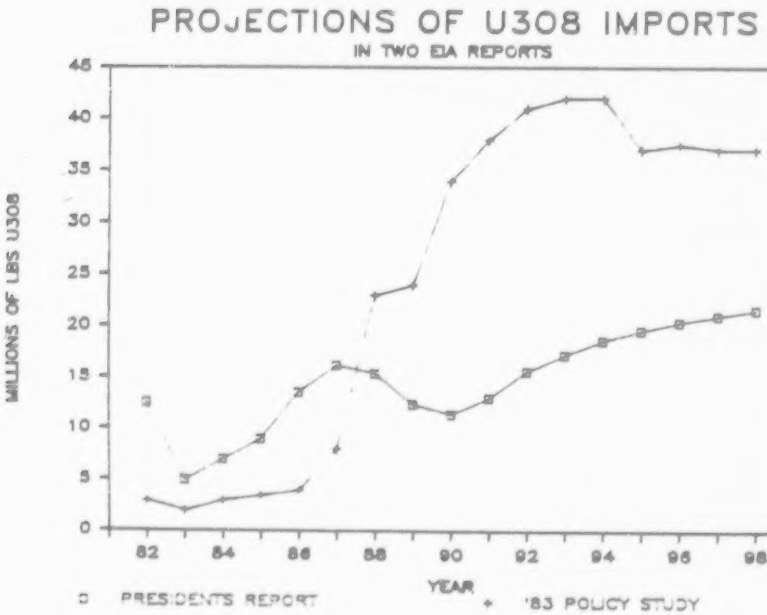
22/ Nuexco July 31, 1984.

Differences in Recent Projections

DOE's projections vacillate from year to year, casting further doubt on their reliability. A simple and recent example illustrates this fact. DOE issued a report entitled "World Uranium Supply and Demand: Impact of Federal Policies" in March 1983. The base case in that report projects much higher imports and much lower domestic production than the "average" case represented by DOE here. The following two charts tell the story:



PROJECTIONS OF U.S. U308 PRODUCTION
IN TWO EIA REPORTS



PROJECTIONS OF U308 IMPORTS
IN TWO EIA REPORTS

Mr. Chairman, the vast improvement which DOE now projects over the situation one year ago is like the thirteenth chime of a clock. It casts doubt not only on itself but also on all that came before.

Problems with Eureka Model

Mr. Chairman, there is another area of concern with the Report. That concern is with the methodology used to develop all the projections. This concern has two dimensions.

The first problem is that the projections in the report are based on a computer model called the "domestic Eureka model."23/ This model has been criticized not only by the uranium industry but also by independent consultants.24/ In its critique of the model pursuant to a contract with DOE, Charles River Associates charged that the model cannot be relied upon for market projections.25/ "It is our opinion," Charles River

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23/ The Eureka model used in the Report is briefly described in United States Uranium Mining and Milling Industry: A Comprehensive Review, App. C at pp. 89-90 (May 1984).

24/ Charles River Associates, Inc., Long-Run Price Projections for Uranium: An Evaluation of Methodologies (July 1980) (CRA-1980).

25/ Charles River Associates specifically stated

(a) that the model fails to clear the market, and that this casts doubt upon the model's price projections;

(b) that decisions under the model are short-sighted and

(Continued Next Page)

Associates said, that "there are enough problems with the model to call any results from Eureka into question."26/ DOE has failed to develop a model which corrects these deficiencies. Moreover, the agency does not have reliable data on foreign costs and reserves. Since the Eureka model is limited in its capacity to predict the future and since DOE lacks reliable input data necessary for the model to function, projections based on the model are obviously of limited value.

Problems with DOE's Methodology Under the Model

The second problem with the projections in the Report arises from the manner in which DOE used the Eureka model. According to statements by EIA officials to AMC, EIA employed Eureka as follows: First, EIA officials selected high and low

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(Continued)

that this gives rise to anticipated cyclical behavior;

(c) that although the uranium market is international, the model is not and that the model therefore cannot give meaningful results on uranium price;

(d) that the model misspecifies investment behavior;

(e) that some components of the model are based on irrational behavior; and

(f) that the model relies on certain assumed values or subjective variables which call into question the model's value for long-term forecasting.

26/ CRA, The Uranium Market Model Eureka p. 27.

values for the approximately 200 variables which are the input to the model. EIA officials then assumed that each variable was independent of the others and that it was distributed between the extremes in a normal distribution. Using a random number generator, EIA then selected a value for each of the variables and ran these through the model. This was done some 100 times. Each of the runs would show volatile behavior, moving up and down. All this, however, is washed out in the published Report. The "highs", "lows" and "averages" shown in the published Report are the highest values from all the runs; the lows, the lowest; and the average, the arithmetic average. The data in the Report thus do not reflect a true worst case scenario or a true best case scenario, or even a true most likely case scenario.

The technical manual for the Eureka model states that

> "Eureka predicts nothing; anymore than a piano plays music. The pianist creates the music and there is a wide range of proficiency among pianists. An unpracticed user of Eureka will simply make noise."27/

One can readily ask whether the May 1984 Report is more noise than music. Colorado Nuclear Corporation, which prepared the original version of the Eureka model, informs us that Colorado Nuclear "does not use" the approach to the model taken by DOE and that there are a number of problems with DOE's methodology

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27/ See Eureka Technical Manual at ii (Sept. 1977).

which call into question DOE's results.28/ In short, it is far from clear that the projections in the Report reflect anything meaningful at all.

The Future

Mr. Chairman, it is useful to compare DOE's relatively rosy forecasts of the future of the domestic uranium industry with a common sense analysis. Common sense would reason as follows: Foreign utilities by and large have filled their uranium requirements for many years into the future.29/ The only significant unfilled uranium requirements are those existing in this country. There have been no orders for nuclear plants in the United States since 1978 and there are none of which we are aware for the foreseeable future. U.S. demand through 2000 is thus limited and can be no greater than that of facilities operating or under construction. There are a number of large foreign uranium deposits currently being developed. There is little market for surplus uranium produced from these deposits other than in the United States.

28/ *See*, *e.g.*, conference with Mr. Dustin Garrow, CNC, 26 July 1984.

29/ For example, Canada requires its utilities to fill their uranium requirements at least 15 years in advance of need. The United States does not have a similar requirement.

At a conference in Saskatoon earlier this year, Canadian officials indicated that they expected to expand Canadian production so as to supply 30 to 50 percent of the world market within a decade.30/ Australian and African producers would presumably account for the rest. The target for this foreign expansion is the United States. The Canadian government in fact is actively encouraging export of its surplus uranium to the American market.31/ Indeed, Canadian uranium is being offered here at prices substantially below the prices Canadian producers are paid in their home market.32/ The Canadian government and the Canadian provinces have supplied more than one billion dollars ($1,000,000,000) in equity capital and cash

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30/ *See*, *e.g.*, Address by Roy E. Lloyd, President, Saskatchewan Mining Development Corporation (June, 1984).

31/ "[W]e are strongly encouraging [Canadian] producers to export their surplus [to] the United States. . . ." Notes for an Address, The Honorable Marc Lalonde, Minister of Energy, Mines and Resources, June 22, 1981.

32/ *Nuclear Fuel*, June 18, 1984, at 4-5 indicates that Ontario Hydro paid an average price for Canadian uranium of (Cdn) $46.50/pound in 1983 and that it will pay $73.40/pound in 1984; $80.00/pound in 1985, and $91 to $98/pound in 1986-91. For comparison, the American spot price is in the teens. The Canadian government may complain that it is unfair to compare the American spot price with the price paid by Ontario Hydro on the ground that Ontario Hydro obtains uranium under long-term contracts. However, the Canadian government requires its utilities to sign such long term contracts for at least 15 years in advance. The fact is that under Canadian government policy, Canadian uranium is being offered and sold in the United States at prices far below the price on Canada's home market.

equivalents to Canadian uranium companies in the last few years alone.33/ Much of the Canadian uranium industry is in fact government-owned. Eldorado Nuclear Limited is owned by the Canadian government.34/ Saskatchewan Mining Development Corporation (SMDC) is owned by the province of Saskatchewan.35/ Government-owned Canadian companies are major participants in virtually all Canadian uranium projects. (The remainder are financed in large part by the province of Ontario through Ontario Hydro.) In addition, the Canadian government allocates production, "reviews" export contracts and prices, and otherwise protects its producers.36/ Finally, the Canadian

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33/ For example, Eldorado received approximately $300,000,000 in uranium from the Canadian government stockpile in return for stock. A government loan of approximately $100,000,000 to an Eldorado subsidiary was also forgiven and a gain of roughly $25,000,000 was realized. *See* Eldorado's 1981 Annual Report at 2 and 25. The Province of Saskatchewan has provided approximately $250,000,000 in equity advances to Saskatchewan Mining Development Corporation (SMDC) and also has provided or has guaranteed certain long-term debts of SMDC. SMDC 1983 Annual Report. Ontario Hydro (owned by the province of Ontario) has advanced Denison and other Canadian producers in excess of $600,000,000. *See*, *e.g.*, Wall St. J., Oct. 8, 1981 ($600,000,000 interest-free loan to Denison and Rio Algom); Nuclear Fuel, Jan. 4, 1982 ($600,000,000 plus); Nuclear Fuel, March 28, 1983 ($600,000,000 at one project). There are numerous other examples of Canadian subsidies.

34/ *See* Eldorado's Annual Report 1983.

35/ *See* SMDC Annual Report 1983.

36/ *See*, *e.g.*, Statement by The Honorable Donald S. MacDonald, Minister of Energy Mines and Resources on Canada's Uranium Policy (Sept. 5, 1974); Pricing Policy published March 1977; Ontario Uranium Mining Industry -- Past, Present and Future by O.J.C. Runnalls (Jan. 1981).

government has an "upgrade-in-Canada" policy which insists (subject to a few recent exceptions) that purchasers of Canadian uranium also obtain uranium conversion services from the Canadian government's conversion facility. This Canadian policy directly threatens the viability of American uranium hexafluoride conversion facilities.37/ If Canada were to construct an enrichment facility, DOE's enrichment business would be menaced as well under Canada's mandatory upgrade policy.

The ultimate "upgrade" lies in proposals to build Canadian nuclear power reactors using Canadian technology and Canadian produced uranium to supply electrical power to the United States. Approximately one-half the electricity generated by New Brunswick Power's Pt. Lepreau Nuclear Plant is already exported to the U.S. and plans are afoot in Canada to build a large new Canadian nuclear plant to produce electricity solely for export to the U.S.38/ Canada is also exporting large quantities of hydroelectric power.

Other uranium-producing countries are similarly involved in directing their uranium industries and in controlling their exports and export prices. For example, South African uranium

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37/ Canada's need for such heavy-handed tactics is unclear in view of the fact that Canada currently runs a $12 billion trade surplus with the United States. Wash. Post, July 26, 1984, p. E1, Col. 1.

38/ *See*, *e.g.*, Nucleonics Week, June 21, 1984, pp. 13-14.

is produced largely as a byproduct of gold mining operations. South Africa has long sold the bulk of its uranium through a government agency (NUFCOR). The Australian government tightly controls Australian production and prices. The Italian and Spanish governments similarly control their countries' uranium activities. These governments have used and are using the United States to dispose of their surplus uranium inventories at fire-sale prices. Spain is in the process of selling millions of pounds of its surplus uranium at prices below acquisition costs right now. Other European governments are similarly deeply involved in their countries' uranium transactions.

In short, it is strictly "Alice-in-Wonderland" to believe that private U.S. producers either compete on a "free" international market or can compete on anything close to fair and equal terms against the various foreign governments involved.

Under these circumstances, it seems to us that only someone who does not want to see what is going to happen to the United States uranium mining and milling industry will fail to see what our future holds under current policies. No computer program or other technological crystal ball should blind us to this. DOE hints at the real future in the last chapter of its

Report 39/ where the agency seems to say that this country may rely on Canadian uranium reserves for all our needs in the year 2000. The Report does not discuss the wisdom of such reliance on foreign energy supplies. Evidently we are doomed to relearn the lessons of OPEC by repeating them.

Mr. Chairman, we believe that the Government faces a choice. It can have domestic free enterprise or foreign-government control in the nuclear fuel area. It cannot have both. We think it foolish and myopic to opt for foreign control for any of our energy needs. Secretary Hodel has in fact voiced precisely this opinion. In a speech last year, Mr. Hodel stated:

> "I have substantial experience with Canadian electricity....Canada will attempt to sell that power for the greatest rate of return available to them."40/

In short, our Nation would be at risk of price gouging or worse.41/

39/ United States Uranium Mining and Milling Industry: A Comprehensive Review 64-65 (May 1984).

40/ Secretary of Energy Donald Hodel, "Electricity: the Global Context," speech at a conference held by Americans for Energy Independence, June 3, 1983.

41/ It is frivolous to assume that reliance on foreign nations for our uranium needs is risk-free. The Australian Labor Party toys with a phase-out of the Australian industry for moral reasons. That nation already bars sales to France as a protest against French nuclear tests in the Pacific. Some Canadian

(Continued Next Page)

Perhaps the reason for the Government's lethargy is that it takes the domestic uranium industry for granted. But the domestic uranium industry is not an inevitability. American mines and mills will not be kept indefinitely on a stand-by status to meet domestic needs in the event of import disruptions or price run-ups. For one thing, the costs are too great. For another, federal and state statutes and regulations require decommissioning. Indeed, companies seeking to maintain facilities on stand-by have been ordered to reclaim them. At least one company failing to do so has actually been sued.42/

(Continued)

provinces have imposed moritoria on development of uranium. Moreover, these other uranium-producing nations already have mechanisms in place to allocate production and to manipulate prices to the disadvantage of American consumers.

42/ In particular, New Mexico has sued United Nuclear Corporation to require decommissioning of facilities on stand-by status at Church Rock, New Mexico. *See also* CNC, *supra* note 8, at p. 30:

> "'excess' production capability will rapidly erode as producers shutdown facilities and enter into decommissioning and reclamation as dictated by the state and federal regulations which govern uranium production facilities. It is highly doubtful that the state authorities will allow the open-ended shutdown of uranium mines and mills. Pressure will be applied to decommission and reclaim after a relatively short period of inactivity."

Other Concerns

Mr. Chairman, we also have some important concerns about DOE policies relating to the uranium industry generally. They bespeak a misapprehension of the depressed condition of the industry and a neglect of the agency's responsibilities in the area of uranium industry viability. In many ways, our concerns with these DOE policies are related to those which underlie our reservations with DOE's Report. Let me quickly touch on one of these concerns below.

Viability Regulations

We are troubled with DOE's implementation of Section 170B of the Atomic Energy Act.[43] Mr. Chairman, you sponsored this provision two years ago in order to force DOE to address the condition of the domestic uranium industry. Section 170B called for DOE to issue regulations setting forth criteria to employ to assess the viability of the domestic uranium industry. In response to this section, DOE originally proposed a concept of viability based upon capability of the domestic industry to meet U.S. domestic requirements.[44] The American Mining Congress supported a variant of this concept in comments filed with the agency. However, this concept was inexplicably abandoned in the final regulations. DOE instead chose to define viability as capability to supply incremental U.S. demand in the event of certain unspecified import disruption scenarios, taking inventories into account. Under this concept of viability, there conceivably could be no account of domestic industry at all and DOE would nevertheless take the view that it would be viable. DOE ended up adopting vague and highly discretionary criteria which are totally at odds with its original proposal.45/ DOE's approach is contrary to our comments, contrary to common sense, and, we believe, contrary to the intent of Section 170B.

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[43] 42 U.S.C. §2210b.

[44] 48 Fed. Reg. 36792 (August 12, 1983).

Conclusion

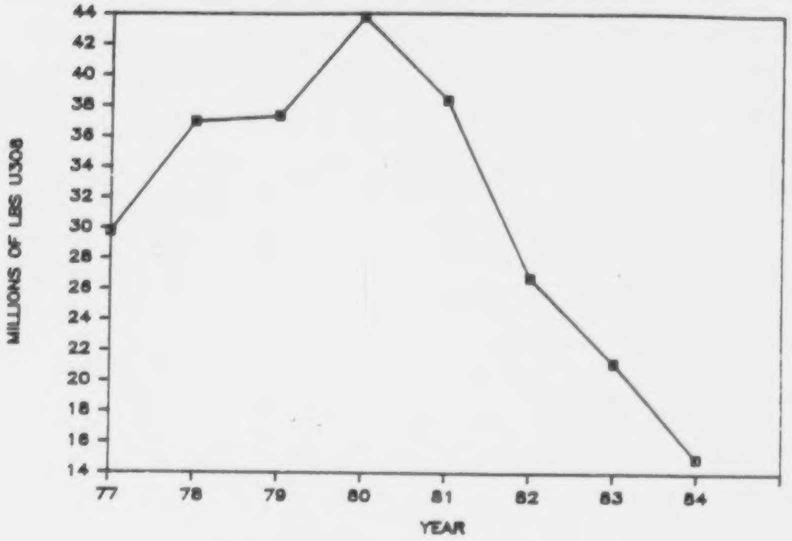
DOE should take appropriate steps to maintain a viable domestic uranium industry. It is obligated to do so under the law, but if it does not do so soon, it will be too late. We regret that DOE has issued a Report which, although it alludes to the domestic uranium industry's current severely depressed state, obscures the industry's industry and its even bleaker future. We appreciate your continued efforts to force DOE to address its viability responsibilities.

Thank you for this opportunity to present our views.

45/ 48 Fed. Reg. 45746 (Oct. 6, 1983).

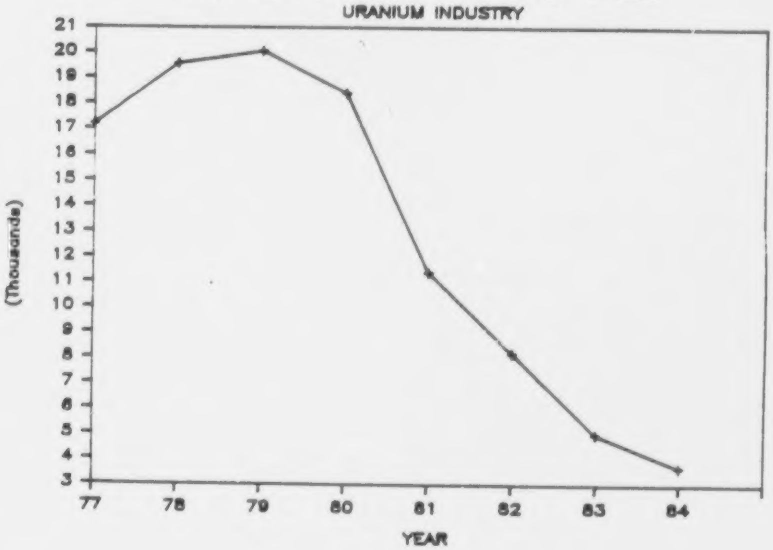
APPENDIX A

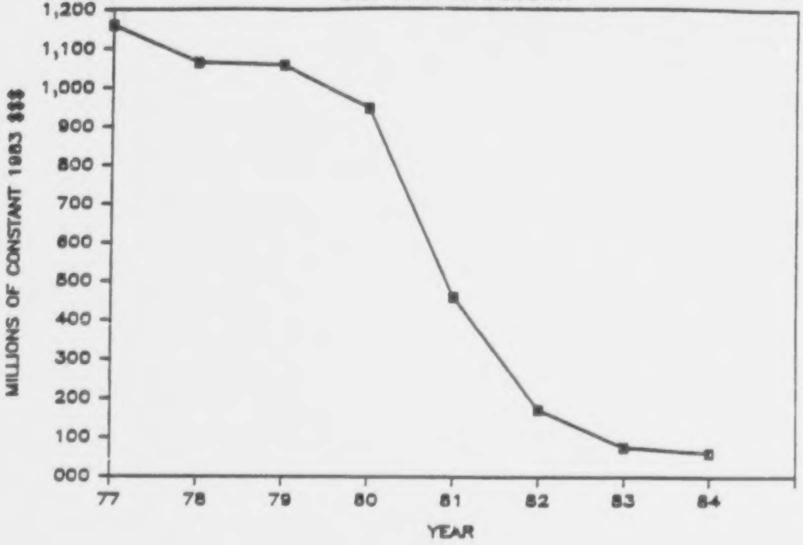
U.S. URANIUM PRODUCTION



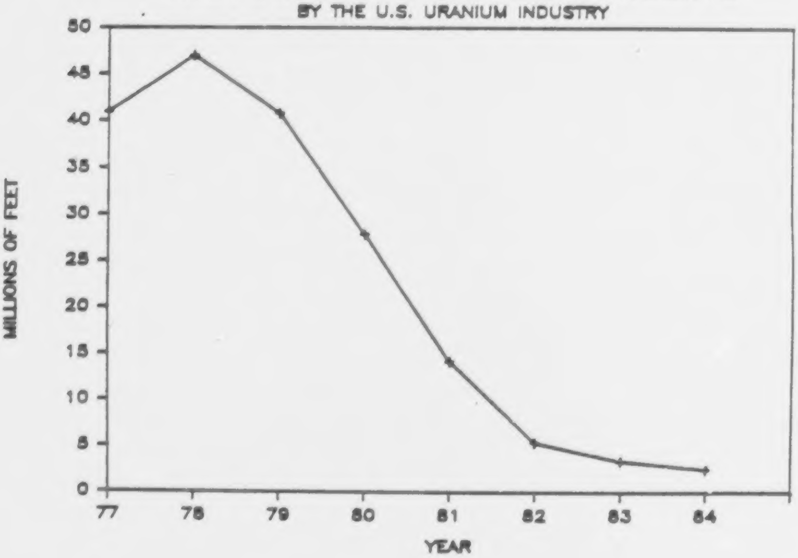
EMPLOYMENT IN THE U.S.

URANIUM INDUSTRY





CAPITAL EXPENDITURES IN THE
U.S. URANIUM INDUSTRY



HISTORICAL SURFACE DRILLING
BY THE U.S. URANIUM INDUSTRY

APPENDIX B

GOVERNMENT PROJECTIONS OF URANIUM MARKET CONDITIONS

The Department of Energy and its predecessors have a long tradition of inaccurate forecasts regarding nuclear power growth and projected uranium market conditions. These forecasts have influenced industry expectations and shaped decisions on uranium industry investment, exploration and production. More important, however, DOE forecasts have significantly influenced government policy regarding the uranium industry, resulting in policy errors detrimental to the industry and the national interest. We strongly caution against any policy recommendations based on government projections of future industry conditions.

Past DOE forecasts of nuclear power growth and commercial uranium requirements have been grossly in error. Charts 1 and 2, attached, show the consistency of DOE's inaccurate forecasts and the magnitude of DOE's errors. Similarly, the projections contained in the DOE's recent Report entitled "United States Uranium Mining and Milling Industry" are in keeping with DOE's tradition of overestimating nuclear power growth and commercial uranium demand. Charts 3 and 4 compare DOE projections with "reasonable case" estimates prepared by Nukem GmbH, a group of international industry consultants. The Nukem industry estimates are in accordance with the views of Nuclear Exchange Corporation of Menlo Park, California. As Charts 3 and 4 show, DOE again significantly overestimates both U.S. nuclear generation capacity and, even more dramatically, U.S. demand for uranium. DOE's misprojections lead the agency into false conclusions regarding the future of the U.S. uranium industry.

Chart 1

GOVERNMENT PROJECTIONS OF U.S.

NUCLEAR GENERATING CAPACITY

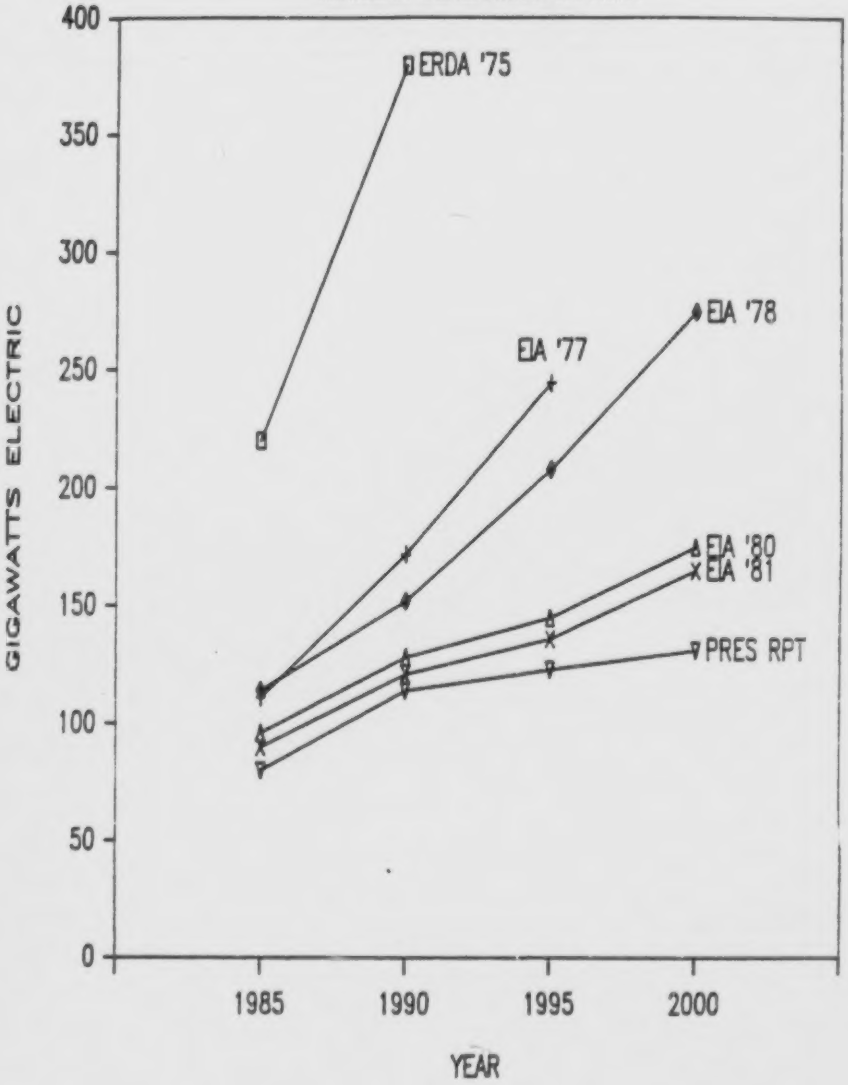


Chart 2

GOVERNMENT PROJECTIONS OF U.S.

COMMERCIAL URANIUM REQUIREMENTS

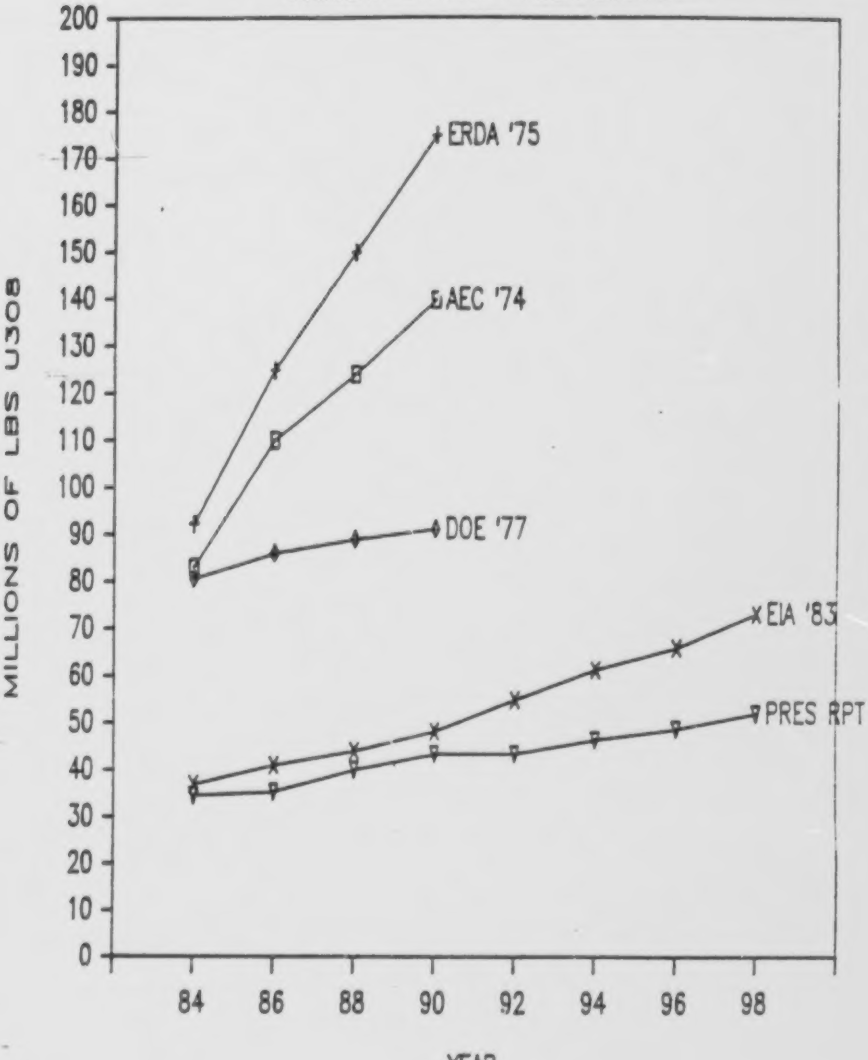


Chart 3

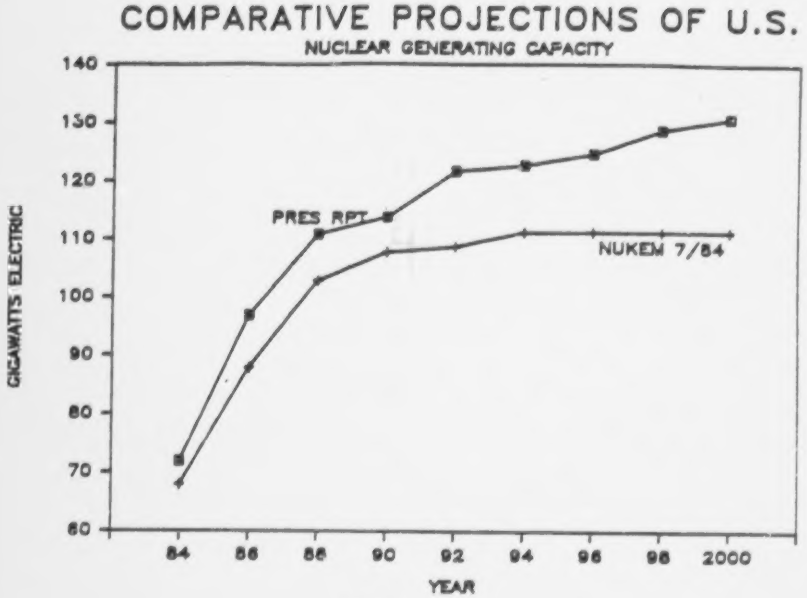
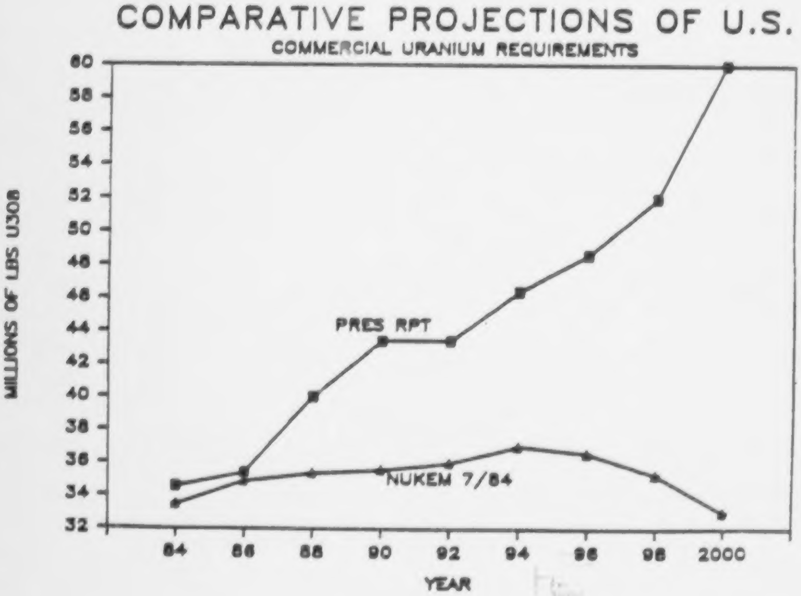

COMPARATIVE PROJECTIONS OF U.S.
NUCLEAR GENERATING CAPACITY

Chart 4


COMPARATIVE PROJECTIONS OF U.S.
COMMERCIAL URANIUM REQUIREMENTS

APPENDIX C

THE S. M. STOLLER CORPORATION

A Subsidiary of Arthur D. Little Inc. 1250 Broadway, New York, N.Y. 10001 (212) 868-2800

NOTES ON PRESIDENT'S REPORT
ON THE
U.S. URANIUM MINING & MILLING INDUSTRY

Fuel Cycle Study Program

July 10, 1984

John F. Hogerton
Joel F. Gingold

Western Office Suite 500, Colorado Building Boulder, Colorado 80302 (303) 449-7220

NOTES ON PRESIDENT'S REPORT
ON THE
U.S. URANIUM MINING & MILLING INDUSTRY

Background

This is a one-time special report mandated by Section 23(a) of Public Law 97-415. Prepared by EIA under date of May of this year and issued under the President's signature in June, it presents a compilation of data on present and projected industry conditions and serves as a frame of reference for the Secretary of Energy's initial determination of the industry's "viability". That determination is presently underway and according to EIA sources is targeted for completion and issuance by the end of July. By law, subsequent viability determinations are due to be made annually over the next 9 years.

Summary Comments

The Report is a workmanlike document that contains a good deal of useful reference data and information on the current status of the domestic uranium industry and market. In our view, however, it is flawed in several important respects which raise questions about the validity and/or usefulness of its projections of future industry and market conditions. In particular:

1. We believe the Report substantially overstates U.S. uranium requirements and thereby (a) correspondingly overstates future domestic uranium production levels and (b) introduces a distortion into its simulation of future price trends.

2. The price terminology used in the Report is conceptually simplistic and, we believe, misleading.

3. The price values projected in the report cover so wide a band as to be of doubtful utility. (Mid-range price values cited in summary discussions are simply the arithmetic mean of the high-low extremes of a projected band. They are not characterized as "most probable" values and, absent data showing the distribution of probabilties associated with a given projection, the reader is not in a position to make any judgment in this regard.)

4. Except for summary data on the forward-cost characteristics of unmined uranium resources, no data, either historical or projected, are given in the Report on industry costs. Hence no insight is provided into the key underpinning of the Report's simulation of future prices--namely, the estimated cost of domestic and foreign production at given production levels at different points in time.

5. The Report does not present any data or shed any light on the historical or current profitability of the uranium industry.

6. The Report does not address the structural changes that appear to be taking place within the domestic uranium industry, nor does it address management policies or attitudes--e.g., criteria for making further capital investment in this field.

These six points are discussed in the paragraphs immediately following.

Overstatement of U.S. Uranium Requirements

The following figures illustrate the difference between the outlook for U.S. uranium requirements projected in the Report vs. that projected in SMSC's last formal uranium market study(1).

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(1) "Updated Uranium Price Forecast", SMSC U Mkt #101, April, 1983.

	Annual U.S. Reactor Fueling Requirements (1000s of tons U_3O_8)			
	1985	1990	1995	2000
A. Report to President	17.6	21.7	23.8	30.0
B. SMSC Analysis	15.9	17.6	18.8	19.1
Differences (A vs. B)	+11%	+23%	+27%	+53%

This substantial difference stems from two roots--a modest difference between the underlying forecasts of installed nuclear capacity, and large differences in fuel cycle assumptions.

As to the former, the Report bases its calculation on a 1983 EIA forecast of growth in installed nuclear capacity, which places the capacity in place at the end of year 2000 at 130.6 GWe. It takes note, however, of the fact that subsequent to the 1983 forecast 10.0 GWe of capacity have been cancelled and 2.2 GWe have had their start-up dates post-poned beyond year 2000, which actions, had they been taken into account, would have reduced the year 2000 figure to 118.4 GWe. The SMSC study referenced above placed end-of year 2000 capacity at 121 GWe and if we were to update that forecast today we would probably pare that figure down slightly, probably to something in the range of 110-115 GWe. In sum, we consider that the Report's use of a 130.6 GWe year-2000 nuclear growth expectation must be viewed in today's light, as optimistic and translates, in and of itself, to a modest overstatement (amounting to less than 10% in the aggregate) of projected U.S. uranium requirements over the balance of this century.

The other factor in the Report's overstatement (as we see it) of projected growth in U.S. uranium requirements is the underlying fuel cycle

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(1) Energy Information Administration; World Nuclear Fuel Cycle Requirements; DOE/EIA 0436(83); Washington, D.C.; February 1984.

assumptions. A comparison of the principal assumptions employed by EIA and SMSC is presented in Table 1. The EIA data were derived from an EIA report on fuel cycle requirements referenced in the uranium review(1) and discussions with cognizant EIA personnel.

Most of the differences are matters of detail, and do not impact very materially on requirements. Both organizations have postulated an increase in transaction tails to 0.25% w/o, reflecting utility desires for an economic optimum tails assay and the availability of the VTAO feature of enrichment contracts. However, the SMSC analysis reflects a subsequent reduction as one postulates increasing uranium prices, also forecast by EIA, and advanced enrichment technology. Similarly, both analyses move to extended cycle length; the SMSC analysis again differs in its detailed treatment. Also, there is a difference in the nuclear plant capacity factors assumed, although this has quite a minor effect on the uranium requirements.

The most significant differenceis in the selected values for equilibrium discharge burnup. In keeping with what we see as current trends in the nuclear industry, SMSC postulated an increase of about 50% in design burnup in the next decade, whereas EIA assumed burnups are based upon long term historical averages, and lie below even currently warranted exposures. Thus, while the SMSC values in 1993 and beyond may be considered a bit optimistic, the burnup to be achieved by both BWR's and PWR's over the next decade or so should lie well above the levels used by EIA for this forecast. This difference in burnup accounts for almost the entire differential between the EIA and SMSC forecasts for annual uranium requirements in the year 2000.

We should note that EIA informed us that it had recently undertaken a new, more detailed study of reactor fuel cycle requirements.

Unfortunately, it has not progressed to the point at which any results are available, nor is it yet possible to even get an indication of how the results will compare to those in the current EIA forecast.

Simplistic Conceptualization of Prices

The statement is made in the Executive Summary of the Report (see page xiv) that "Uranium purchase contracts have typically been for long-term delivery . . . ". Yet the Report uses only two price terms: "spot prices" and "market prices", which it defines as follows(1):

"Spot price:	Price for material being bought and sold on the spot market (i.e., small quantities of material for short-term delivery)."
"Market price:	Prevailing price level in the uranium market at or near the time of delivery. Generally reflects spot prices as mutually agreed by the contracting parties or independently determined by an unbiased outside arbitrator." (Note: underlining does not appear in the text but is supplied by us for emphasis).

No reference is made in the Report to "term prices", nor does the Report address the fact that there have been times in the history of the uranium market that substantial differences have existed between prices for spot and term purchases. We regard this as a serious omission.

The price values projected in the Report are "market price" values and we presume mean what the above-cited glossary definition says that term means. We have two criticisms to make on this usage. The first is that the definitional phrase underlined above--namely, that "(market prices) generally reflect spot prices"--is at odds with the historical fact, alluded to in the previous paragraph, that at times substantial differences have existed between spot prices and prices concurrently negotiated for near term supply contracts or for deliveries under existing term contracts (so-called negotiated settlement prices.)(1)

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(1) See Glossary, pages 67-68.

The second criticism we have to make stems from the fact that in the future, as in the past, term supply contracts will doubtless be negotiated several or more years prior to the start of deliveries. This will most certainly be the case in instances in which the supply entails significant capital investment by the supplier, as in a new production venture or in expanding or even restarting existing production facilities. In the past, uranium suppliers have displayed reluctance to commit large sums to new or expanded production ventures without first entering contracts for base-load production quantities with pricing terms providing reasonable assurance of a viable venture. Lead times in this field have been such that base load contracting for a new production venture entailing conventional technology (open pit or underground mining) has typically taken place four to seven years in advance of initial contract deliveries. Looking ahead, and considering the adverse experience most if not all producers have had in this field in recent years, we cannot conceive that they will forego this kind of protection; indeed, we expect that it will be much more difficult, rather than less difficult, to set the stage for new capital investment. Thus, the Report, in projecting prices as they are expected to be "at or near time of delivery" set its aim at a target of only secondary interest to the producing industry (and of user utilities as well) whose primary interest, it seems safe to say, focuses on the question: at what price level can we reasonably expect to be able to negotiate near term supply contracts in the years ahead?

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(1) To which it should be added that the implications in the glossary defintion that unbiased outside arbitrators tend to set settlement prices at the prevailing level of spot prices is also at odds with historical fact.

Width of Band of Projected Price Values

The Report uses a modified version of the EUREKA system (originally developed by D.R. deHalas of Colorado Nuclear) for its computer simulation of uranium market behavior and projection of price values. As well as projecting "market prices" (see prior discussion), the Report also projects associated weighted-average delivered prices. In an attempt to take into account what the Report refers to as "uncertainty in the input data" runs were made with a range of variants of critical input factors; hence the resulting broad band computed prices commented upon earlier in these notes, e.g. a range of from $24.80 to $121.40/pound in 2000.

Runs were also made to examine the impact on computed prices of a range of hypothetical Federal policies in regard to uranium imports--e.g., the imposition of different import ceilings and the imposition of an import tariff.

The Report cautions the reader against over-literal interpretation of the results obtained, advising that they be viewed more as general indicators than as absolute expressions. Our own view is that the principal utility of the analysis lies in providing some broad insight into the relative uranium price implications of alternative Federal import policies.

Absence of Data on Uranium Production Costs

In the section of the Report dealing with domestic uranium resources it is stated that, "Since 1964, (domestic) uranium production costs have increased by about 300% due to the general inflation" and that, "In addition, increasingly stringent environmental and health and safety regulations have also raised the cost of production, in some cases obviating the feasibility of production from known deposits." But, apart from estimates of unmined domestic reserves in different forward cost categories, the Report presents absolutely no data on the cost of domestic production.

There is no discussion of or information provided on the trend of unit costs in the different modes of uranium production (underground mining, open pit mining, solution mining, etc.), no examination of what is emerging as an important new cost factor--namely, the costs entailed in maintaining and restarting shutdown facilities, no assessment of quantities producible over time at different cost or price levels, etc. The only light shed on the production cost inputs used in simulating market behavior and projecting prices is that these inputs were provided to EIA by Nuclear Assurance Corporation and International Energy Associates, Ltd.

We view all of this as a serious weakness in the Report since absent insight into this key input, one must take the output of the computer simulation completely on faith.

Absence of Data on Industry Profitability

It was our understanding that EIA intended to collect data on the profitabilty of domestic uranium production operations and, indeed, that a contractor was retained to develop a survey questionnaire for this purpose. Since the Report finesses this subject altogether we must assume either that an effort was made and aborted or that this subject is being reserved for the viability determination and will be reported on when that determination is made and issued.

Absence of Information on Industry Structure and Management Attitudes

In projecting price rises in the future and an associated rebuildup of domestic industry investment, employment and production, the Report appears to be making the assumption that the one will follow automatically from the other. The Report does not address the question of whether or not structural changes are taking place in the industry or whether or not new management policies toward reinvestment and/or contracting are to be anticipated. This, we feel, is another serious omission. It remains to be seen whether the viability determination will take these questions into account.

TABLE 1

ASSUMPTIONS USED IN PROJECTIONS OF URANIUM REQUIREMENTS

		EIA	SMSC
1.	TAILS ASSAY (w/o)	0.25	1983-0.20 1988-0.25 1993-0.20
2.	CAPACITY FACTOR (%)	1983 - ~56% increasing to 2000 - ~65%	65%
3.	WEIGHTED AVERAGE EQUILIBRIUM BURNUP (GWD/MTU)		
	BWR	21.6	1983-28.0 1988-35.0 1993-43.0
	PWR	29.4	1983-33.0 1988-42.0 1993-52.0
4.	NOMINAL CYCLE LENGTH (months)	All reactors increasing to 18	80% of BWR, 50% of of PWR at 18 by 1993

APPENDIX D

AMERICAN MINING CONGRESS

Review and Critique
of
United States Uranium Mining and Milling Industry - A Comprehensive Review
A Report to the Congress by the President of the United States, Prepared by the Energy Information Administration of the U.S. Department of Energy, dated May 1984

by

Colorado Nuclear Corporation

Monument, Colorado

September 1984

AMERICAN MINING CONGRESS

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by

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September 1984

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PREFACE

The American Mining Congress (AMC) retained Colorado Nuclear Corporation (CNC) to prepare an independent review and critique of the subject Presidential Report, and to develop its own assessment of future uranium market conditions based upon CNC's perspective of the marketplace.

While the sponsor of this report happens to be a uranium producer type organization, CNC has conducted the study so as to provide a purely objective appraisal of the Presidential Report. The American Mining Congress did not, in any way, attempt to influence the substance of this report. This study does not represent only a producer's viewpoint or only a utility company viewpoint, but rather, is intended to represent the combined viewpoint. Also, CNC takes a totally neutral position regarding governmental regulation and policies affecting the import of uranium.

For those who may not be familiar with Colorado Nuclear Corporation, it is a small consulting firm specializing in the nuclear fuel cycle, especially uranium supply. Our clients include electric utility companies, uranium producers and governments. CNC is made up of highly qualified individuals. The average nuclear experience base of the technical personnel comprising the company is 18 years, ranging from 7 to 30.

CNC has prepared a comprehensive report of the status of the uranium market annually since 1976. Subscribers to this study include electric utility companies, uranium producers and government agencies, both domestic and foreign. CNC personnel have actively participated in the uranium marketplace since before 1969 when the Atomic Energy Act was modified to permit private ownership of enriched uranium.

CNC developed the EUREKA computer model of the uranium industry in 1976-1977, and has continually utilized and refined the model since then. The U.S. Department of Energy acquired the EUREKA program from CNC in the late 1970's, and this program was used extensively by DOE in preparing the Presidential Report. The DOE sponsored additional work by CNC to develop an enhanced international version of EUREKA, which will soon be operational. The EUREKA computer program utilizes the concept of dynamic programming wherein the logical decision making processes of buyers and sellers of uranium are modeled.

CNC also provides a uranium market information system to clients as a subscription service. The BONANZA system details the uranium requirements of each utility company and its uranium supply commitments and inventory status. It also provides information on production capability of each uranium producer and its supply commitments. The code then goes on to equate the supply and demand and calculates unfilled uranium requirements and unsold production capacity. BONANZA provides information that is especially useful for both strategic planning and tactical studies. A similar system, called ELDORADO, deals with non-U.S. uranium supply and demand.

CNC participates with electric utility clients in uranium procurement activities and in assisting in the development of uranium supply policies. CNC also assists clients in matters relating to the supply of uranium enriching services.

As a result of CNC's extensive activities in the uranium marketplace, CNC is uniquely qualified to prepare this report.

EXECUTIVE SUMMARY

1. Introduction

This report provides a review and critique of: "United States Uranium Mining and Milling Industry - A Comprehensive Review", a Report to the Congress by the President of the United States, dated May 1984. The report was prepared by the Energy Information Administration of the U.S. Department of Energy.

Colorado Nuclear Corporation(1), in preparing this critique, has assumed that domestic electric utility companies make their uranium procurement decisions based solely on cost without regard to uranium origin; in order that the CNC market projections be comparable to those made by EIA wherein they made that assumption. CNC normally assumes there will be some level of restraint exhibited on the extent of imports.

CNC, because of its involvement in the uranium marketplace, and having created the EUREKA model utilized by EIA in its projections, is particularly well qualified to make this review and critique.

2. Review of EIA Report

EIA made extensive use of the EUREKA computer model of the domestic uranium industry in preparing their analyses. The EIA report indicates that the domestic uranium mining and milling industry is currently severely depressed but that in a few years a period of sustained growth will begin. The uranium supply industry had previously expanded to meet a growth in demand that did not occur. There has been a large accumlation of excess uranium inventories and the discovery and development of several large high grade deposits in Canada and elsewhere provides a distinct commercial threat to domestic producers.

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(1) For those not familiar with Colorado Nuclear Corporation, please see the Preface.

Figure 1 vividly shows the downward trends experienced in key business parameters of the uranium industry in the past five years, as tabulated in an appendix to the EIA report. Expenditures for mining and milling facilities peaked at $761 million in 1977, some 21 times the 1983 level. Expenditures for exploration peaked in 1978 at $452 million, some 11 times the 1983 level. Employment in the uranium industry grew rapidly in the 1970's, peaking in 1979 at 3.7 times the 1983 level. Production increased in the 1970's from 13,200 tons in 1973 to 21,900 tons in 1980, some 2.1 times the 1983 level of 10,600 tons.

EIA projects an installed nuclear capacity of 114 GW in 1990, 123 GW in 1995 and 131 GW in 2000, and continues to grow thereafter. It estimates imports to gradually increase, eventually comprising 32 to 46% of domestic supply.

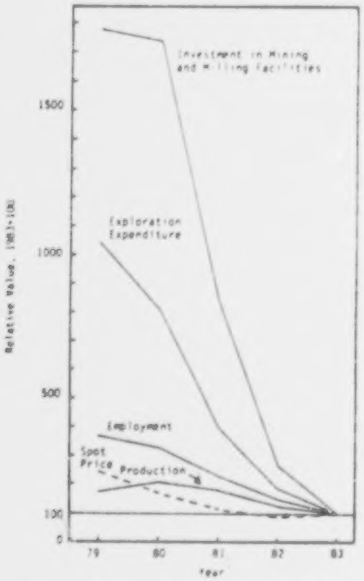

Figure 1: Key Business Parameters - Uranium Industry

3. Colorado Nuclear Corporation Projections

CNC believes that a fundamental realignment of the domestic and international uranium markets has transpired over the past several years and will continue. Assuming nominal future reactor terminations, domestic uranium demand will level off within a few years. The annual domestic requirements will probably range between 12,500 to 17,500 tons U_3O_8. Even under conditions of moderate imports (say 25% to 35% of needs), the domestic uranium producers would only realize a demand of 9,000 to 12,000 tons U_3O_8 per year. This is substantially lower than the high of 21,800 tons produced domestically in 1980.

Another factor that could have far-reaching implications in the uranium marketplace is that the Federal Energy Regulatory Commission (FERC) will soon release a preliminary rule which if enacted would significantly restrict the abilities of electric utility companies to recover inventory holding costs through Allowance for Funds Used During Construction (AFUDC). If adopted, this ruling in its present form may lead to the placement of substantial additional excess uranium inventory into the secondary market, which could cause the spot price to decrease and/or to remain low longer into the future.

CNC projects an installed uranium fueled electric generating capacity in the 1990's of only 93 to 107 GW and a corresponding reactor uranium demand of 14,000 to 20,500 tons U_3O_8 per year with the capacity and the uranium demand both beginning to decline in the latter 1990's as capacity factors decline with age and units are retired.

4. Critique of EIA Report and Comparisons with CNC Findings

Basically, CNC believes the EIA report portrays an unrealistically optimistic future outlook for the domestic uranium mining and milling industry.

The EIA, in using the EUREKA uranium market model, assigns random values (within a range) to most of the variables. CNC normally structures the input data values so as to associate a relative probability with each EUREKA run.

The EIA uses a considerably higher projection of domestic installed uranium fueled electric generating capacity than does CNC. A comparison of the EIA projection with the CNC low - mid - high projections is given in Figure 2. CNC attributes this difference to the fact that the EIA projection was prepared a year or two ago, whereas the CNC projection is up-to-date.

The EIA similarly projects a much greater domestic uranium demand than does CNC. A comparison of the EIA projection and the CNC low - mid - high projections is given in Figure 3.

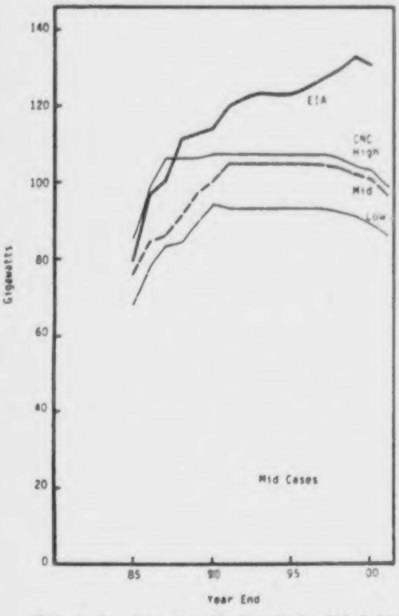

Figure 2: Gigawatt Projections, EIA & CNC

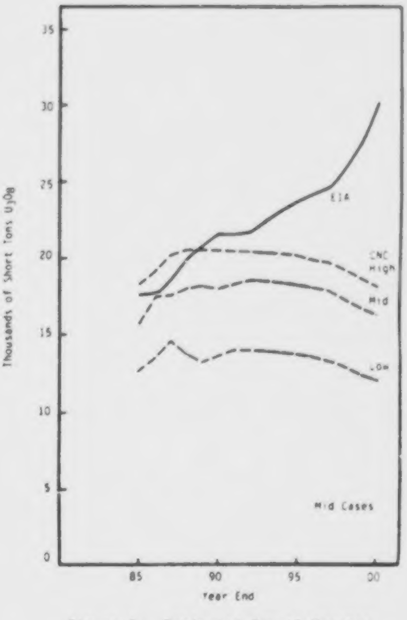

Figure 3: Projected Annual Reactor Uranium Demand, EIA & CNC

Another matter of substantial difference between EIA and CNC is the projected import penetration. Cost competitiveness is a primary determinate of sales success. The contracting flexibilities made available through relatively low production costs of various foreign uranium deposits lead to commercial successes. Although exceptions exist, domestic production is generally higher cost than the international competition. A study by DOE in 1983 ("U.S. Uranium Production and Projected Economic Capacity", October 1983) placed the average forward cost of all types of domestic production at over \$28/lb U_3O_8 and the forward cost of a hypothetical new project at over \$37/lb; and these costs do not include a return on investment.

Figure 4 gives a comparison of the EIA and CNC projections of mean tonnage of uranium imports, and Figure 5 gives similar information, but expressed as a percentage of annual reactor demand. During the 1990's, EIA calculates the imports to average 38% of reactor demand, whereas CNC projects an average of 69%.

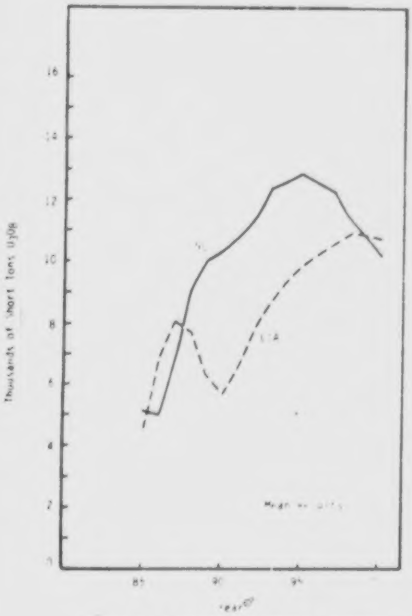

Figure 4: Projected Import Tonnage EIA & CNC

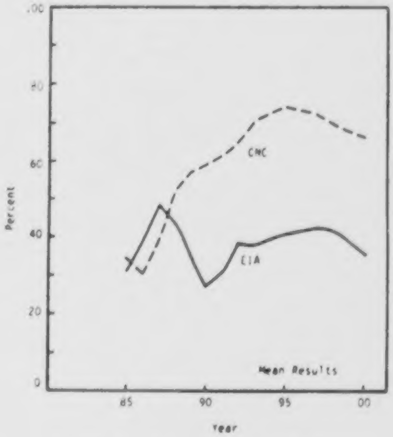

Figure 5: Projected Imports, Percent of Total Demand, EIA & CNC

The uranium prices projected by EIA and CNC show closer agreement than the other parameters being compared. CNC projects a more abrupt increase but in the 1990-95 period the projections are about the same.

Due to the differences in the projections of total uranium demand and imports, and other factors, there is a wide disparity in the projections of net demand on domestic production between EIA and CNC. The comparison is shown on Figure 6.

EIA concludes that domestic uranium requirements during a national emergency could easily be met by relying on Canada. CNC wishes to point out that Canadian production is largely committed to a variety of foreign countries and Canada might not want to divert any of these deliveries to the U.S. Short of such diversion, Canada would have to increase production, which takes time and would probably require a premium price.

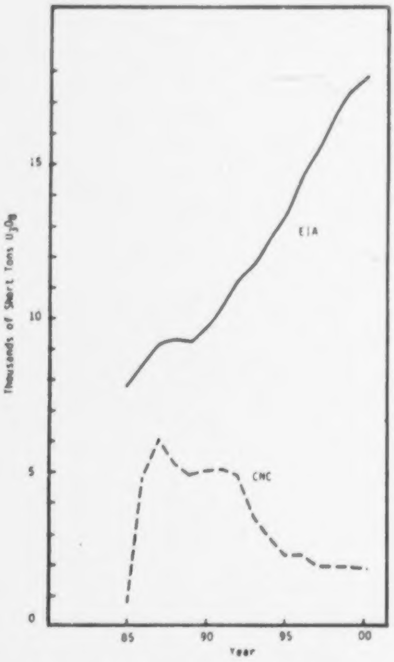

Figure 6: Projected Annual Demand for Domestic Production, EIA & CNC

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1.0 INTRODUCTION

The Nuclear Regulatory Commission Authorization Act of 1983 required that the President submit a one-time report to the Congress addressing the status of the domestic uranium mining and milling industry. President Reagan forwarded the mandated report to Congress in May 1984 ("United States Uranium Mining and Milling Industry - A Comprehensive Review"). This study was prepared for the White House by the Department of Energy, specifically the Energy Information Administration (EIA).

EIA utilizes a modified version of the Evaluation of Uranium Resources and Economic Analysis (EUREKA) system to conduct quantiative analyses of the domestic uranium supply industry. The EUREKA model is a complex computer code which evaluates uranium market dynamics and develops forecasts of possible future market conditions. EIA has used the model for several years to assess the potential impacts of federal government policy decisions on the domestic uranium industry.

In preparing this report, CNC has assumed that domestic uranium buyers make procurement decisions based solely on economic criteria and disregard uranium origin; in order that our uranium market projections be comparable to EIA's "current policy" conditions. CNC normally assumes there will be some level of restraint exhibited on imports.

2.0 REVIEW OF EIA METHODOLOGY AND CONCLUSIONS

CNC is uniquely qualified to review EIA's methodology as well as its implementation. CNC has worked closely with EIA over the years as the federal government has adopted the EUREKA system. However, the application of this forecasting tool is entirely at the discretion of the EIA.

2.1 EIA Methodology

The Energy Information Administration utilized the EUREKA computer model extensively in preparing their projections of the uranium market. EUREKA is a forecasting tool which provides the capability to examine market responses to the numerous uncertainties in modeling/input assumptions. The model has been utilized by CNC over an eight year period to conduct detailed analyses of potential future market conditions including long term uranium contract price movements, inventory, supply dynamics, domestic exploration, as well as other aspects of the domestic uranium market.

The EUREKA model has been subjected to rigorous technical review due to its acquisition by EIA. Oak Ridge National Laboratories (ORNL) conducted a comprehensive evaluation of the code in 1982. The resultant report (Validation Report - An Assessment of the EUREKA Uranium Mining and Milling Model) was published in September 1982. ORNL's evaluation of the model concluded that "Although some improvements to the economic foundation of the code seem warranted, EUREKA can be a useful tool for making forecasts of uranium market activity if and only if, the user has an expert understanding of both the code and the uranium market". In other words, the forecaster utilizing EUREKA makes the market projections through the careful selection of variables (recognizing the interdependencies inherent in the model) and interpreting the various outcomes. The EUREKA model is merely a forecasting tool to be used by the experienced uranium market analyst.

The EUREKA model was originally developed to analyze the U.S. uranium industry, primarily the forces of supply and demand as they were manifested in price movements. In the mid-1970's when EUREKA was conceived, the domestic industry was the major uranium producing region in the world and future demand for uranium to fuel the ever ambitious forecasts of installed nuclear capacity appeared to strain the capabilities of the supply sector. However, the situation has changed dramatically due to the continuing decline in forecasted demand for uranium as well as the emergence of foreign production sources which have aggressively entered the international marketplace. In order to address this fundamental shift in the production of uranium, CNC has developed a new generation of the EUREKA model called INTERNATIONAL EUREKA which provides for significantly enhanced analytical treatment of both the domestic supply industry and the foreign sources of production. CNC created this model under contract to the EIA which is currently working to implement the code.

EUREKA (domestic) is not a classic econometric model of the domestic uranium sector in the sense that empirically-derived statistical coefficients are relied upon totally to develop forecast outcomes. The model is based on the concept of market dynamics and as such incorporates substantial feedback as well as subjective variables which attempt to model the decision-making processes on the part of both uranium producers and consumers. These subjective variables can exert significant influence on the model results and therefore require a thorough knowledge of the industry for informed selections to be made. The EUREKA methodology has been criticized in the past on this aspect of its approach to modeling. CNC maintains that the market dynamics concept is totally valid when applied to the uranium market but places certain requirements on the expertise of the forecaster.

The EUREKA code does not conduct exhaustive modeling of the individual production facilities in the U.S. The code provides for the input of known specific production sources, their estimated available quantities and the attendant "need" price (defined as the sales price necessary to sustain production at the indicated level including the recovery of all costs as well as an acceptable rate of return). In addition, EUREKA generates its own production facilities necessary to meet the net demand on the domestic industry. The code contains relatively detailed mine and mill cost models as well as in-situ leaching capabilities. Therefore, after taking into account the estimated availability of uranium from production sources input to the model, EUREKA examines U.S. uranium resources (which have been separated into 75 categories based upon grade, size and depth) and then develops candidate production sources based upon the mine/mill cost models. The EIA version of the code contains the capability to input the identified production sources but not the associated "need" price. Also, CNC inputs specific sources for a 10 year forward period while the EIA forecast only extends for four years.

As has been stated previously, the domestic EUREKA model does not explicitedly address the non-U.S. uranium market. Data are input to the model regarding such parameters as the current level of forward commitments by domestic buyers for foreign source uranium, however the future availability of non-U.S. uranium is an exogenous variable. The two versions of the code (EIA and CNC) handle this issue differently. EIA utilizes an input array which determines the availability of foreign source uranium as a function of domestic production level in any given year. A foreign uranium supply curve is derived based upon the marginal production costs of available foreign supply sources. Then based upon the uranium demand from non-U.S. nuclear programs, an annual quantity of "excess" foreign supply available to the U.S. market is derived. Interestingly, EIA's input to EUREKA regarding this future potential from foreign sources extends for only a ten year period. In the Presidential Report, this ten year horizon extends through 1991.

CNC inputs its estimation of future availability of foreign source uranium through a two-dimensional array which extends through the year 2000. CNC analyzes the total uranium resource situation in each foreign supply region and allocates that potential into various forward cost categories. In addition, each currently operating and proposed development project is examined and anticipated "need" prices determined. Then, CNC derives supply curves extending through the year 2000 at various cost levels which are then translated into "need" prices. After examining the foreign nuclear programs' uranium requirements as relate to the supply curves, the available quantities and need prices are input to the model for processing. EUREKA takes this foreign source material into account as it makes decisions regarding which production source (domestic or foreign) satisfies the criteria sufficient to bring additional capacity into operation.

2.2 Major Conclusions and Findings of EIA

The EIA report which President Reagan submitted to the Congress recognizes that the current status of the domestic uranium mining and milling industry is one of severely depressed conditions and goes on to conclude that in a few years conditions will improve. The industry aggressively expanded production capacity during the 1970's in anticipation of a robust demand for uranium from the domestic nuclear power industry. Several major forces have impacted on the uranium supply sector, particularly the substantial decline in the forecasted installed uranium-fueled electric generating capacity, the accumulation of substantial inventories of natural and enriched uranium as buyers continued to take delivery of committed uranium supplies far in excess of actual needs, and the discovery and phased development of several large high grade uranium deposits in Australia and Canada (northern Saskatchewan). The domestic uranium supply industry has contracted substantially over the past several years with the production level in 1983 being approximately one-half of the 1980 level. Employment, exploration expenditures, and capital investment have followed suit.

Figure 2.2 graphically depicts trends in major aspects of the uranium industry during the past ten years. The figure shows the (relative) value of several key business parameters relative to the value of that parameter in 1983 (1983 = 100). The raw data for this figure are from the Presidential Report, Appendix D.

Total industry employment in uranium exploration, mining and milling (expressed in terms of thousand person-years) grew rapidly during the latter half of the 1970's, experiencing a peak level in 1979 that was 3.7 times the year end 1983 value.

Capital expenditures for mining and milling peaked in 1977 at $761 million, some 21 times the 1983 value. Expenditures for exploration peaked in 1978 at $452 million, some 11 times the 1983 value.

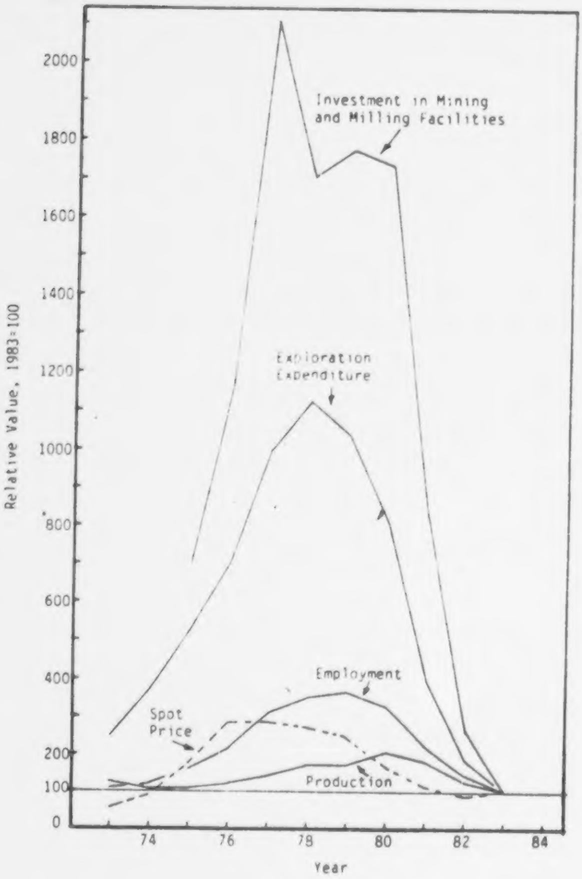
Uranium concentrate production expanded during the 1970's from its 1973 level of 13,200 STU_3O_8 to 21,900 tons in 1980, some 2.1 times the 1983 value. Domestic uranium production has since declined to about 10,600 tons in 1983 and is estimated at about 8,000 to 9,000 tons in 1984.

Foreign uranium producers with relatively "low-cost" uranium sources have aggressively entered the U.S. market competing for increasing shares of future business. While the Australian producers have been hindered by their government's edicts regarding minimum acceptable prices, the northern Saskatchewan producers (primarily Key Lake Mining Company) have been successful in capturing several long term contracts with domestic utility buyers. In addition, these producers compete aggressively for available spot market opportunities. Foreign suppliers have made near term deliveries to both U.S. utility buyers as well as to some domestic uranium producers which have found it economically advantageous to reduce or suspend operations and purchase uranium on the open market at depressed prices.

Figure 2.2

Historic Performance of Key Business Parameters

Uranium Industry



The EIA report concludes that the domestic uranium supply industry will continue to contract as production and employment further decline, but that after a few years there will start a trend of increasing demand for domestic uranium which will continue through this century. Market prices for uranium (constant dollars) are projected by EIA to remain constant or decline over the next two years and then experience a strong upward trend throughout the latter half of the 1980's and beyond. Uranium imports become a greater portion of annual procurement over the "next few years", "eventually comprising from 32 to 46 percent of net U.S. supply sources". Capital investment and exploration expenditures remain low during the next few years, followed by steady growth.

Prior to turning to CNC's assessment of the future uranium market, it should be noted that CNC believes that a fundamental realignment of the domestic and international uranium markets has transpired over the past several years and will continue. Assuming that future reactor cancellations are nominal, uranium demand by U.S. utilities will tend to level off and stabilize within the next few years. The annual uranium requirements will probably stay in the range of 25 to 35 million pounds (12,500 to 17,500 tons) depending upon the ultimate installed nuclear capacity. Even under conditions of "moderate" procurement of foreign source uranium (perhaps 25-35% of annual needs), the U.S. uranium production industry is unlikely to recover to its previous annual production high of 43.7 million pounds U_3O_8 (21,800 tons) in the foreseeable future. Optimistically, the annual demand on the domestic supply industry cannot be expected to exceed 18.0-25.0 million pounds U_3O_8 (9,000 to 12,500 tons).

3.0 COLORADO NUCLEAR CORPORATION PROJECTIONS

3.1 Methodology

CNC structured a number of possible future uranium market scenarios and processed these through the EUREKA program. Certain input variables were arranged so as to allow probabilistic processing of the EUREKA output. This allows us to express future import trends and other factors in a fashion which reflects the uncertainties in the forecast. For example, it was assumed that the uranium demand variable exhibits the following probability distribution:

Scenario	Probability
High Demand	0.1
Mid Demand	0.6
Low Demand	0.3

The specific probabilistic variables include the future domestic uranium demand, the extent to which excess inventories of uranium are released annually into the marketplace, the average remaining life of existing domestic uranium production facilities, the "forward" buying span of the buyers and the extent to which buyers increase the buying span in response to increases in price and vice versa. The many other variables in the EUREKA input were assigned CNC's current estimate of their most likely value.

As will be further discussed later, the future domestic uranium demand we are using in the 1990's is substantially lower than used by EIA. This, together with apparent differences in the projected relative competitiveness of domestic versus foreign uranium production, causes our projections of import penetration to be vastly different than those of EIA.

CNC did not impose any limitation on the amount of imported uranium in any EUREKA runs. The annual imports are calculated by the code with no restraints on upper limit. This approach coincides with EIA's analysis assuming "current policy".

CNC's projection of import penetration is given in Section 3.2.4. The pattern used in reporting the results is to show them probabilistically for all the scenarios considered, which include the high, mid and low scenarios for projected uranium demand with the mean and the other limits of the 80% confidence interval shown. Separately, an analogous "worst case" set of results (as viewed by the U.S. supply industry) are also given. These consist of only the sub-set of the scenarios for which the low uranium demand prevails.

The reader should be appreciative of the fact that the results presented are not an absolute prediction by CNC. Rather, the results represent our projection if future events reasonably correspond to the input assumptions we made in characterizing the future. For example, any acts by the federal government that are not explicitly provided for in the inputted scenarios could drastically alter the results.

3.2 Projections Based on CNC Input

3.2.1 Input Data

CNC made 50 EUREKA runs using various input data. Based on these, we selected 18 sets of input data for a series of runs, in which the input data were characterized probabilistically as described earlier. The runs excluded were ones where the variable change made little difference in the result.

3.2.1.1 Uranium Inventory Usage and Mobility

Uranium buyers (utilities) currently holding inventories which exceed levels deemed necessary for "pipeline purposes" or for contingencies (strategic stockpiles) have relatively limited options. These excess inventories can continue to be held and reduced through future consumption or the utility may decide to sell this material in the open market at a price generally thought to be developed by near-term supply and demand forces. In addition, the inventory holder could opt to loan the material for return at some future date.

CNC incorporates these inventory management concepts in its modeling through a variable describing inventory "mobility". This models the utility inventory holders attempting to sell some percentage of their excess uranium stockpiles in the secondary market.

Uranium inventory mobility can have a substantial impact on the uranium market, particularly in the near-term if other utilities meet unfilled uranium requirements through purchases of this material. CNC desires to emphasize the following point. CNC understands that the Federal Energy Regulatory Commission of DOE (FERC) intends to release a preliminary rule which if enacted would significantly restrict the abilities of electric utility companies to recovery inventory holding costs through Allowance for Funds Used During Construction (AFUDC). If adopted and implemented by the cognizant regulatory authorities, this ruling may lead to substantial sales efforts involving excess uranium inventories and further aggravate spot market dynamics. The longer the spot price remains low, the greater the shutdown of existing production facilities, and hence the more difficult it will be for domestic production to meet an increasing share of future unfilled demand.

3.2.2 Installed Nuclear Capacity and Uranium Demand

Three domestic uranium demand cases were developed for this analysis. CNC maintains a proprietary data base for the U.S. nuclear utility industry called BONANZA. The BONANZA data base contains extensive information regarding each nuclear utility's reactors, their current status as well as nuclear fuel supplies. Individual reactor design characteristics are modelled in the computer code and annual uranium requirements are calculated based upon such parameters as fuel cycle lead times, enrichment tails assay, capacity factor, and commercial operation date (actual or scheduled). The computing software also has the capability to take into account such considerations as the consumption of uranium inventories considered "excess" to each particular utility's desired contingency stockpile.

CNC subjected the BONANZA data base to careful review particularly regarding the future commercial operation dates of reactors currently under construction and the likelihood of termination of units still under construction or planned (only two units are "planned" at the present time). CNC professional staff examined each reactor not yet in operation and developed three "commercial operation scenarios" based upon the official commercial operation date, current percent completion, and other factors known or anticipated to impact on the schedule of each reactor. The following general description provides the rationale for developing the three installed uranium-fueled electric generating capacity cases for this study.

All of the installed capacity cases assume that those domestic nuclear reactors currently in a halted or planned status are not built. In addition, it is assumed that no new reactors are constructed during the time frame under evaluation, nor will there be any reactors which are recommissioned at the end of their licensed life span.

High Case

Schedule Slippage:
Reactors will generally enter commercial operation in accordance with official schedules.
Terminations:
Four reactors aggregating 4.6 GW

Mid Case

Schedule Slippage:
97 to 100% complete slip 6 months
90 to 96% " " 12 "
80 to 89% " " 24 "
65 to 79% " " 36 "
<65% " " 48 "
Terminations:
Six reactors aggregating 6.7 GW

Low Case

Schedule Slippage:
97 to 100% complete slip 12 months
90 to 96% " " 24 "
80 to 89% " " 36 "
<80% " " 48 "
Terminations:
All reactors 70% complete

The U.S. installed uranium-fueled electric generating capacity cases (High, Mid, and Low) are shown on Table 3.2.2-1. The High Case expands rapidly reaching 106 GWe by 1987 and remaining level at 107 GWe until the late 1990's. The Mid Case assumptions result in a more gradual increase up to 86 GWe in 1987 and 105 GWe by 1991. The Low Case shows moderate expansion through 1990 then a period of stability until the late 1990's when units begin to be retired. In the mid case, the last new unit is added in 1991.

CNC believes that future installed capacity will generally parallel the Mid Case. However, recent events in the nuclear utility industry which have lead to the termination of reactors nearing completion suggest that the Mid Case may possibly prove to be ambitious. The three CNC-developed installed capacity cases are shown on Figure 3.2.2-1. Recent installed capacity forecasts by others are given in Table 3.2.2-2.

CNC's projections of domestic reactor uranium demand are given in Table 3.2.2-1 and in Figure 3.2.2-2. These demand projections are based on system average capacity factors of:

High Case --- 70%
Mid Case --- 60%
Low Case --- 55%

The High Case demand reaches 40.5 million pounds/year U_3O_8 by 1987 and remains fairly constant through the mid-1990's. The Mid Case assumptions leads to a uranium demand of 36.0 million pounds U_3O_8 by 1988 with general stability until the end of the century. The Low Case produces a relatively constant annual demand at 27.0-28.0 million pounds until the mid-1990's.

Table 3.2.2-1

U.S. Installed Uranium-Fueled Electric Generating Capacity and Annual Uranium Demand

(Demand in millions of pounds U_3O_8)

Year	Low		Mid		High	
End	GWe	Demand	GWe	Demand	GWe	Demand
1984	63	28.6	64	28.6	67	36.8
85	68	25.7	76	31.7	85	36.7
86	77	27.0	84	35.3	99	38.2
87	83	29.3	86	35.2	106	40.5
88	84	27.5	91	36.0	106	41.2
89	89	26.7	97	36.3	106	41.0
1990	94	27.6	100	36.0	107	41.0
91	93	28.1	105	36.9	107	41.0
92	93	28.1	105	37.2	107	40.9
93	93	28.0	105	37.1	107	40.8
94	93	27.8	105	35.9	107	40.6
1995	93	27.6	105	36.7	107	40.4
96	93	27.1	105	36.1	107	39.8
97	93	26.8	105	35.9	107	39.5
98	92	26.0	104	34.9	106	38.5
99	91	24.9	102	33.6	104	37.1
2000	89	24.3	101	32.9	103	36.3
01	86	22.2	97	30.4	99	33.6
02	82	20.8	93	28.8	95	31.9
03	76	17.3	88	24.2	90	26.9

Source: Colorado Nuclear Corporation

Figure 3.2.2-1

CNC Projection of Installed Uranium Fueled Electric Generating Capacity

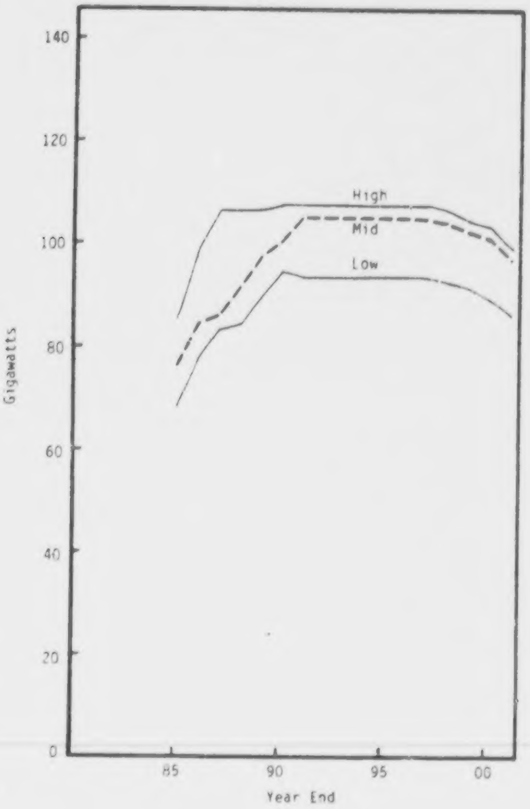


Table 3.2.2-2

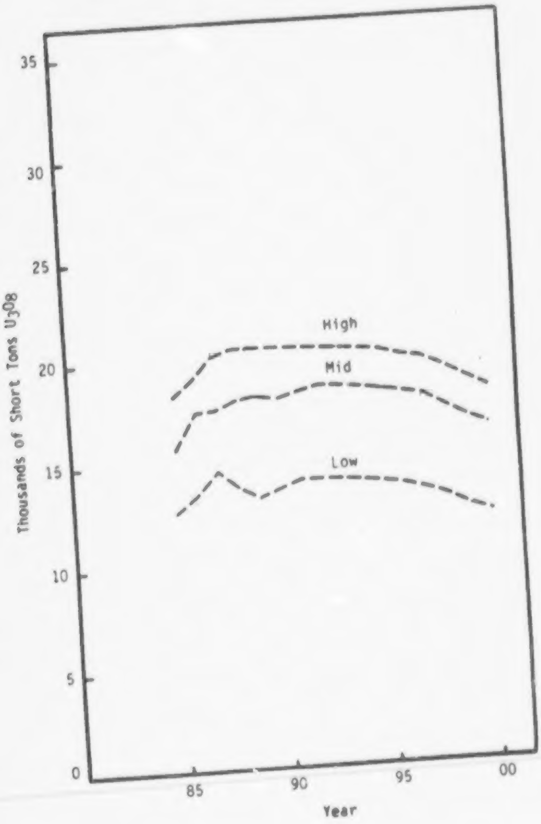
U.S. Installed Uranium-Fueled Electric Generating Capacity Forecasts

	1985	1990	1995	2000
	gigawatts			
Colorado Nuclear Corp.				
Low	68	94	93	89
Mid	76	100	105	101
High	85	107	107	103
NUKEM (6/84)	77.9	108.2	115.5	111.6
US DOE				
1983 Enrichment Annual Report	73-91	112-118	113-122	109-125
EIA				
- Presidential Report	80.1	114.0	122.7	130.6
- 1983 Energy Review	84.7	110.8	119.2	122.7

Source: Various

Figure 3.2.2-2

CNC Projection of Reactor Uranium Demand



3.2.3 Non-U.S. WOCA Installed Uranium-Fueled Electric Generating Capacity and Annual Uranium Demand

CNC reviewed recent installed capacity forecasts for the non-U.S. WOCA (World Outside Communist Areas) and found that virtually all current perspectives are in reasonable agreement with the assumptions used in the Presidential Report. Installed uranium-fueled electric generating capacity in the year 1990 generally falls in the area of 280 GWe while the 1995 forecasts tend to fall in the range of 215-230 GWe. By the year 2000, the forecasts tend to show greater divergence but still fall in the range of 250-275 GWe.

Based upon this review, CNC believes that the forecasts of non-U.S. WOCA installed capacity utilized by EIA in the Presidential Report are reasonable.

3.2.4 Projected Import Penetration

The estimates of import penetration into the domestic uranium market are predicated on the basis that there are no regulatory restraints on the use of imports and that such procurement is based purely on market considerations ("current policy"), so as to correspond with the assumptions made by EIA.

Figures 3.2.4-1 through -4 show data on the estimated import penetration. Figure 3.2.4-1 shows the CNC projected imports, expressed as a percentage of total reactor demand. The mean reaches 40% in 1987, 60% in 1990, 74% in 1995 and then declines. The upper and lower limits shown bracket the 80% confidence interval range.

Figure 3.2.4-1

Projected Annual Uranium Imports
Percent of Total Reactor Demand

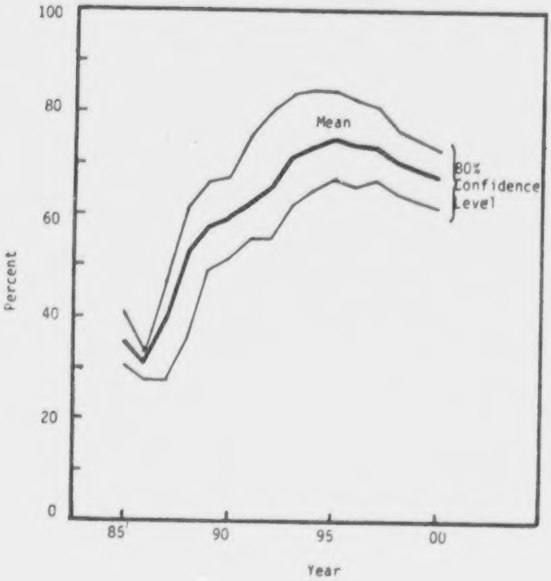


Figure 3.2.4-2 shows the projected tonnage of imports. For comparison, the mean of the total reactor demand is also shown.

Figure 3.2.4-3 shows the projected percentage import penetration for the five scenarios that are based on the low demand projection. Here, the penetration reaches 56% in 1990 and 83% in 1995. Figure 3.2.4-4 shows the similar information, expressed as tonnage.

Figure 3.2.4-2

Projected Annual Uranium Imports tonnage

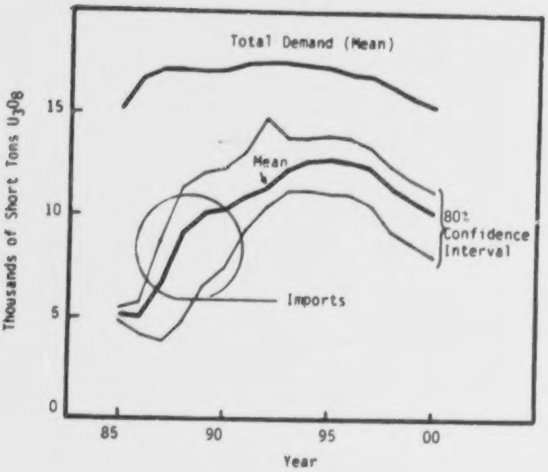


Figure 3.2.4-3

Projected Annual Uranium Imports - Low Demand Scenarios

Percent of Total Reactor Demand

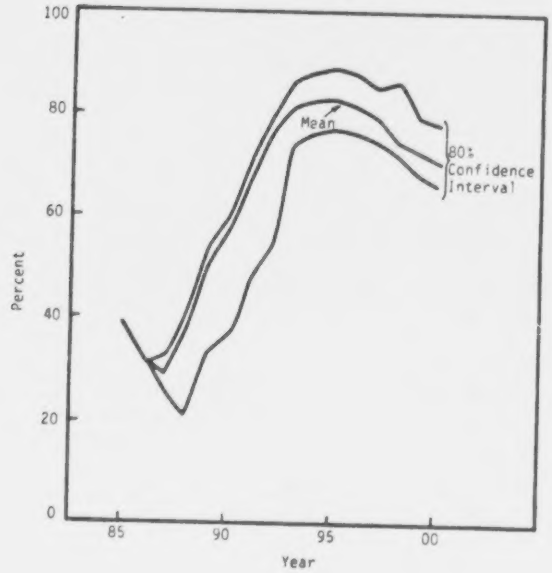
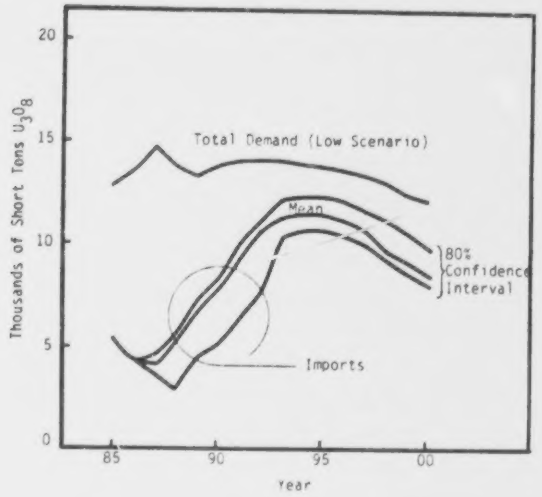


Figure 3.2.4-4

Projected Annual Uranium Imports - Low Demand Scenarios tonnage



4.0 CRITIQUE OF EIA REPORT AND COMPARISONS WITH CNC FINDINGS

CNC believes that the EIA report portrays an unrealistically optimistic future outlook for the domestic uranium mining and milling industry. Although EIA's findings regarding the projected levels of uranium market prices are not inconsistent with CNC's conclusions over the recent past, other elements of the projections differ markedly.

4.1 EIA Variable Selection Process

At the request of the American Mining Congress, EIA provided CNC with a significant portion of the EUREKA input variables and the resultant output in the Presidential Report. EIA provided CNC hard copies of the input variable settings for the 25 cases selected by the EIA as "representative" and used to establish the Base Case for their report. CNC understands that the EIA conducted substantially more runs of the EUREKA model but then reduced the number of runs through a selection process. In addition, the EIA provided the variable changes which were input in order to conduct the various import limitation sensitivity analyses as well as the 25% import tariff case (these runs were carried out utilizing the 25 Base Case runs with slight input modifications).

The EUREKA model allows the forecaster to either conduct runs using "default" settings for the input variables or by inputting "user-adjustable" settings selected by the analyst. The EUREKA code contains approximately 200 single-value variables which are user-adjustable and almost 30 user-adjustable input data arrays. Therefore, the model allows for significant analytical flexibility and the selection of variable settings does have a substantial impact on the results. As would be expected, not all variable settings exert equivalent influence on the outcome. Depending upon the scenario under study, a relatively few variables require specific attention. The preferred analytical approach to the utilization of the EUREKA model requires that the forecaster determine the scenarios which are to be examined (e.g., future demand for uranium, current production capacity and capacity additions that can be implemented, limitations on imports if any, possible changes in inventory strategies, resource constraints, availability and prices of foreign uranium, and many other factors) and then develop the variable settings appropriate for that case usually expressed as a range around a "reasonable" mean. The analyst then conducts a sufficient number of model runs varying the "prime" variables through their designated range(s). The final step is to interpret the outputs, examining all of the model results provided in each output and deriving the forecast based upon the EUREKA results tempered by substantial expert judgment.

Based upon direct discussions with EIA personnel responsible for the implementation of the EUREKA model for the Presidential Report, CNC understands the EIA approach to variable selection entailed the establishment of a normal distribution around a mean value for specific variables. The next step was to conduct a random selection of the input variable setting for each run based upon potential settings which occurred within two standard deviations of the mean. EIA states that this approach would capture 95% of the possible settings. CNC does not use this approach for input variable selection and sees several potential shortcomings. First of all, establishment of the mean value has a significant effect on the normal distribution as does the selection of the range. It is not entirely clear as to the selection process utilized, however, EIA did utilize outside consultants in some instances. The actual random selection process must be based upon sound statistical methodology (CNC assumes that the EIA process was theoretically acceptable). Lastly (and perhaps most significantly) the random selection approach fails to capture any interrelationships which exist between the variables themselves. Such interrelationships do actually exist in the EUREKA model and must be recognized by the forecaster during the analytical process. The random selection of input variable settings therefore violates certain aspects of the EUREKA methodology. In effect, each computer run is based on a random combination of all input variables and therefore no runs represent the "worst or best" combinations of input data.

The EIA derived its "mean outcomes" through the arithmetic averaging of all results from the 25 Base Case runs. This approach can lead to distortions because of equivalent weighting being applied to all results. Previously, CNC utilized a similar approach but has since incorporated probabilistic techniques which allow for differential weighting based upon the relative probability of each variable setting in the scenario under study.

4.2 EUREKA Model Variable Settings

CNC reviewed the majority of EIA-derived inputs to the EUREKA model. Although the EIA and CNC versions of the code do differ slightly, most variables are common to both. EIA provided hard copies of the input variable settings and the corresponding outputs for the 25 Base Case runs as well as the settings utilized for the analyses of the import limitations and import tariff scenarios.

The majority of "user-adjustable" variables exert only a small influence upon EUREKA results but allow for the forecaster to input settings deemed appropriate and to test various sensitivities. In addition, internal linkages do exist in the model logic and, therefore, the forecaster can alter the variables which exhibit direct correlation.

Input variable mean values as well as ranges (minimum-maximum) for several of the more "influential" EUREKA inputs as utilized by EIA are given in Table 4.2. Comparable mean values and ranges used by CNC are given in Table 4.3. While noticeable differences do occur between several variable settings, CNC does not believe that these single input differences significantly impact analytical results. The major input differences occur in the array inputs for projected domestic uranium demand, availability and price of identified U.S. production, and projected availability and price of foreign-source uranium.

The uranium demand array is the total annual demand of the domestic uranium-fueled electric generating capacity through the forecast period. Annual demand is derived by adjusting reactor requirements for enrichment feed delivery needs. EIA has treated this array randomly, varying the annual demand each year for each of the 25 Base Case runs. CNC assumes that the mean value in any year is the expected value derived from the stated high, low and mid forecast. EIA's basis for developing the range of values (assumed to be two standard deviations) is unclear.

EUREKA contains a subroutine which allows the forecaster to alter the nuclear industry's perceived view of forward demand during the forecast period (i.e. alter the domestic uranium demand forecast at future dates). EIA makes extensive use of this feature in its EUREKA runs. In fact, EIA inputted a revised demand forecast during each of 21 years (1983-2003) for each run. Therefore, the model "sees" a new demand forecast each year and must continually adjust its decision-making processes. The annual uranium demand values in the forecast array were also varied randomly.

Unlike the EIA, CNC does not make extensive use of the forecast change feature. CNC believes that altering the industry's perception of future demand can be useful for sensitivity analyses purposes. However, continuously changing the future uranium demand can create difficulties in interpreting EUREKA model results. The EUREKA model was developed primarily to allow the forecaster to test potential uranium market responses to a logical series of variable input changes (i.e. sensitivity analysis).

Table 4.2

EIA Input Variable Settings to EUREKA Model

VARIABLE	MEAN	RANGE
DCF	0.10	0.054 to 0.139
EXTL	17.3	6.87 to 25.0
FWNOW	50.1	30.3 to 66.4
LYRS	14.0	---
ULTTON		4.03×10^6 to 5.68×10^6
YRFRCT	1.31	0.17 to 2.12
XF	0.15	0.135 to 0.168

- DCF is the discount rate used in cash flow analyses, in fraction/year.
- EXTL is the average remaining life of production facilities existing at the beginning of the EUREKA run in years.
- FWNOW is the average price of uranium being delivered under all contracts, in the first year of the EUREKA run, in $/lb U_3O_8.
- LYRS is the forward buying span, the forward year in which 10% of the amount needed in that year is placed under contract now in years.
- ULTTON is the ultimate mineable uranium resources, including past production and erosion in tons U_3O_8.
- YRFRAC is the average uranium inventory desired to be carried by buyers, in years of forward demand.
- XF is the fraction of the excess inventories that can be utilized each year.

Table 4-3

CNC Input Variable Settings

VARIABLE	MEAN	RANGE
DCF	0.18	0.10-0.22
EXTL	9.50	9.50-15.0
FWNOW	40.6	---
LYRS	12	10-14
ULTTON	3.2×10^6	2.00×10^6 to 4.85×10^6
YRFRCT	1.00	1.00-2.00
XFC	0.20	0.10-0.30

- See Table 4.2 for definitions.
- XFC is the fraction of excess inventory that is allowed to change ownership each year (and therefore be utilized).

4.3 Installed Uranium-Fueled Electric Generating Capacity and Uranium Demand Forecasts

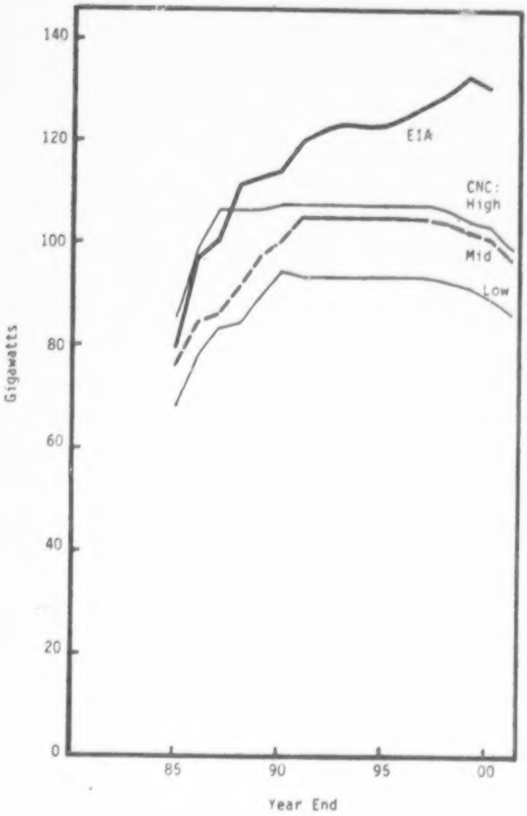
Forecasts of installed uranium-fueled electric generating capacity and the resultant uranium demand form a crucial foundation of any uranium market analysis. EIA utilizes the installed capacity forecasts contained in their report, "Commercial Nuclear Power: Prospects for the United States and the World" (DOE/EIA-0438) which was published in November 1983. This publication documents the projections of U.S. nuclear capacity which were presented in the 1982 Annual Energy Review and Annual Energy Outlook. The installed capacity forecast utilized in the Presidential Report envisions 114.0 GWe of capacity by the year 1990 and growing to 133.1 GWe by 1999. The EIA projections assume a substantial resurgence in new orders for nuclear plants, such that nuclear capacity continues to increase throughout the 1990's. EIA acknowledges that this forecast is high and that "Since the projections of nuclear power capacity used in this analysis were finalized, 10 nuclear reactors representing a total of 10.0 GWe of generating capacity have been cancelled, and 2.2 GWe have been delayed beyond the year 2000. Utility uranium requirements and inventory levels will be affected by these and any additional cancellations and delays. Ultimately, this would result in a lower level of domestic production and prices than suggested by the analysis presented in this report". Termination of a reactor, besides reducing future demand, releases a substantial inventory into the secondary market "today". The installed uranium-fueled generating capacity (mid-case) utilized by CNC herein forecasts 100 GWe by the year 1990, reaching 105 GWe over the period 1991-1997 and then a decline to 102 GWe by the year 1999 and declining thereafter as capacity is retired.

For comparison purposes, the three CNC-developed installed capacity cases together with the EIA Mid Case forecast utilized in the Presidential Report are shown on Figure 4.3-1.

Figure 4.3-1

Projected Installed Uranium Fueled Electric Generating Capacity, EIA and CNC

Mid Cases



The actual uranium demand by the U.S. utility industry results from the interaction of several variables. Reactor requirements, consumption of uranium stockpiles considered in excess of desired inventory levels, as well as enrichment feed requirements dictated by long term contracts entered into with the Department of Energy are all factors which determine the uranium demand realized in the marketplace.

EIA specifically recognizes the effect on uranium demand due to the early enrichment feed requirements resulting from previous contracts for enriching services with the DOE. The EIA analysis does not attempt to account for the decrease in these early feed requirements provided for by the recently released Utility Services enrichment contract. Based upon those U.S. enrichment contracts already executed and the general feed delivery relief being offered by the DOE to those utilities evaluating conversion, CNC believes that the mismatch between enrichment feed deliveries and actual utility reactor requirements will be substantially eliminated by 1987, after which the feed deliveries will approximate reactor requirements (EIA assumed that condition will not prevail until 1993).

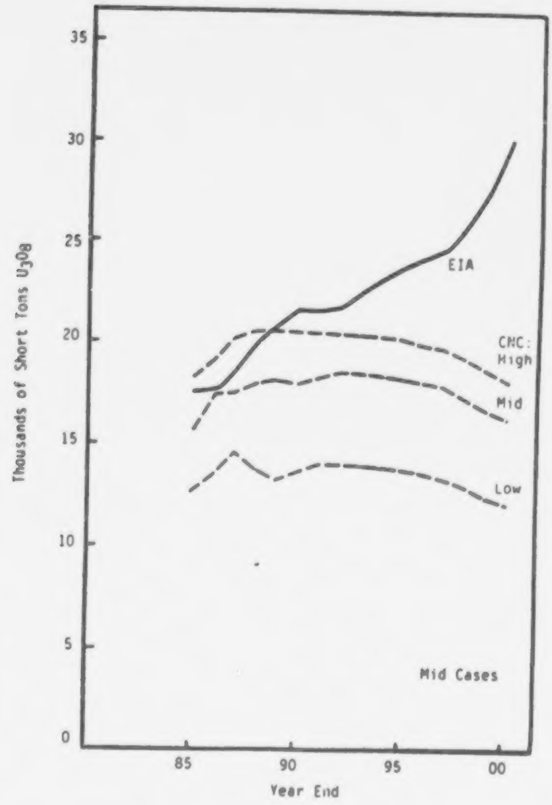
These factors combine to have a significant impact in the forecast uranium demand particularly in the 1990's. Uranium demand by the U.S. nuclear utilities over the period, 1984-2000, for the three CNC-derived cases, together with the uranium demand reported by EIA for its Mid-Case forecast in the Presidential Report, is shown on Figure 4.3-2.

The EIA domestic uranium demand (apparent utility market requirement) for the Presidential Report Mid-Case reasonably parallels the CNC mid case demand through the 1980's. However, the EIA demand begins to increase substantially commencing in the early 1990's while CNC projects a general leveling off in demand as reactors enter commercial operation and only reload requirements are seen in the marketplace followed in the

Figure 4.3-2

Projected Annual Reactor Uranium Demand

EIA and CNC



mid 1990's with a significant reduction in requirements. EIA assumes much fewer terminations of existing projects and forecasts a resurgence in nuclear power commencing in the late 1990's and in the next century which necessitates the acquisition of initial core material in the mid 1990's and beyond. While such an occurrence could actually transpire, CNC believes that a prudent forecast at this point in time should not anticipate a nuclear power revival.

For comparison purposes, the CNC-derived mid case results in a natural uranium demand level of 36.0 million pounds U_3O_8 (18,000 ST) in 1990 while the EIA mid case shows uranium demand at a level of 42.0 million pounds U_3O_8 (21,000 ST). The disparity increases in 1995 with the EIA forecast exceeding the CNC forecast by almost 12.0 million pounds U_3O_8 (6,000 ST). By the year 2000, the EIA forecasts domestic uranium demand at 60.0 million pounds U_3O_8 (30,000 ST) per year while the CNC forecast has decreased to 32.9 million pounds U_3O_8 (16,400 ST), only 55% of the EIA figure.

4.4 Unfilled U.S. Uranium Requirements

The Presidential Report concludes that 44% of domestic uranium needs are unfilled in the year 1990 and rises to 93% by the year 2000. CNC has examined the extent of that portion of uranium demand currently classified as "unfilled" (remaining to be provided after taking into account delivery commitments and inventory draw-down). Based upon the Mid-Demand assumptions as well as an inventory mobility of 20%/year (i.e. 20% of that uranium inventory classified as "excess) is sold each year in the secondary market), CNC concludes that domestic unfilled uranium requirements will represent 22% of demand in the year 1990 and exceeds 90% in 1995. Therefore, CNC belives that EIA's analysis results are ambitious in the near term but reasonable by the mid-1990's.

4.5 Domestic Uranium Resources

CNC is in agreement with EIA's uranium resource data. However, it should be recognized that recent DOE data for Reasonably Assured Resources at a forward cost of $30/pound total 360 million pounds U_3O_8 (180,000 ST). Comparing this estimate to the total domestic demand over the period 1984-2000 of 597 million pounds (298,000 ST) suggests that the U.S. industry would only be able to supply 60 percent of domestic needs from known relatively "lower cost" resources. The probability of producing all of these resources at the stated forward cost are considered very remote. Therefore, uranium market conditions which lead to increased foreign uranium dependence on the part of U.S. buyers (low market price) may produce an environment of reduced procurement options. In the absence of price levels sufficient to encourage U.S. exploration activities and production, utilities may be forced to procure uranium from foreign sources.

The EUREKA model projects various market conditions necessary for domestic production to reach forecast levels. Long term contract price levels, exploration expenditures and capital expenditures projected in Section 3.0 are "necessary and sufficient" conditions to allow for the forecast production levels. In the event that market price levels remain depressed for an extended length of time (say through late 1980's) then the ability of the domestic industry to respond becomes increasingly difficult.

4.6 Foreign Production Capacity

The EIA study reports non-U.S. uranium production data (historical and projected) contained in the latest "Red Book" (OECD Nuclear Energy Agency/International Atomic Energy Agency, Uranium: Resources, Production and Demand, (December 1983). The production capability estimates contained in the NEA/IAEA publications are always subject to interpretation and tend to lack total objectivity.

EIA correctly observes that high-grade reserves have been discovered in Australia and Canada (Saskatchewan) which could be developed if sufficient market commitments are secured. None of these potential projects are without significant uncertainties. The current Australian Labor Party policy allows for the expansion of existing projects (Ranger and Nabarlek) and feasibility studies for Olympic Dam (a large multi-mineral deposit). The latter project depends heavily on the future copper market and could be developed by the early 1990's. Prospects for future development of high-grade Saskatchewan deposits hinge not only upon markets but also such considerations as uranium needs of the partners and technical issues. For example, the Waterbury Lake project involves difficult mining conditions (very high-grade but mineably only by underground methods) and equity participants representing perhaps diverse corporate strategies.

Foreign uranium producers have aggressively entered the U.S. marketplace and successfully secured forward delivery commitments. Future uranium procurement decisions by U.S. utilities will be based on many sometimes conflicting criteria and, therefore, cannot be predicted precisely. However, the recent trend indicates the continued success of foreign producers.

Domestic uranium producers are unable to compete for long term sales commitments outside of the United States. U.S. suppliers reportedly exported approximately 48.7 million pounds U_3O_8 (24,300 ST) over the period 1967-1983, but now have forward commitments to deliver to foreign buyers only 7.2 million pounds U_3O_8 (3,600 ST) through the year 2000.

Foreign uranium buyers have focused their procurement activities on alternate supply regions for several reasons. Diversification of sources has lead to long term agreements with Canada, Australia, South Africa, and Central African countries. Also, equity participation in production facilities in these regions has been deemed prudent. While several foreign uranium consumers have actively evaluated ownership of U.S.-based uranium production facilities, only a handful of such projects have come to fruition.

Cost competitiveness is a primary determinate of sales success in the international uranium market. The contracting flexibilities made available through relatively low production costs lead to commercial successes. Although exceptions do exist, in general U.S. uranium production is higher cost than many of its international competition with scant likelihood of that condition changing. The recent analysis prepared by the DOE ("U.S. Uranium Production and Projected Economic Capacity", October 1983) shows average U.S. forward production costs exceeding $28.00/pound for all types of production (underground, open pit, solution mining and by-product). The estimated forward costs for hypothetical new projects (underground and open pit) exceeded $37.00/pound. (Note: These cost estimates do not provide for return on investment.)

Comparable analyses for foreign production are not available but may be as little as 50 percent of the above estimates for high grade reserves.

4.7 Foreign Uranium Penetration into U.S. Market

EIA addresses the issue of foreign uranium penetration into the domestic market by examining "net imports" (imports less exports). While it is recognized that uranium exports from the U.S. are expected to be minimal (recent EIA data as of 1/1/84 report total export commitments of 11.7 million pounds (5,850 ST) for the period 1984-1994), this EIA perspective of quoting net imports does slightly understate the future penetration of foreign uranium.

The tonnage of projected uranium imports over the period 1984-2000 as developed by EIA and CNC are shown on Figure 4.7-1. Only the mean results are displayed. The EIA mean projection shows total imports remaining generally in the range of 6,000-8,000 short tons U_3O_8 during the latter half of the 1980's and only exceeding 10,000 short tons after 1995.

CNC's analysis (mean results) suggests a much greater dependence upon foreign source uranium with annual imports reaching 10,000 short tons by 1989. The quantity of foreign uranium projected to be imported to the U.S. peaks in 1995 at over 12,800 short tons.

The recently-enacted domestic uranium "viability" legislation focuses attention on the commitment by utility buyers to import uranium expressed as a percentage of domestic uranium requirements. The EIA concludes that the share of utility market requirements satisfied by non-U.S. uranium will peak at 41 to 54 percent in 1987 and then decline to between 18 and 39 percent by 1990. Figure 4.7-2 shows the projected imports in terms of a percentage of total demand. During the 1990's, EIA projects that imports will average from 32 to 46 percent of requirements.

CNC's projection differs markedly from the EIA's results. Based upon CNC's assumptions regarding the potential availability and need price for foreign-source uranium, import penetration could reach 50 percent by 1988 and exceed 60 percent by the early 1990's. Import dependency peaks at almost 75 percent in 1995 but then begins to decrease gradually through the latter half of the 1990's.

Figure 4.7-1

Projected Importation of Uranium

EIA and CNC

Tonnage

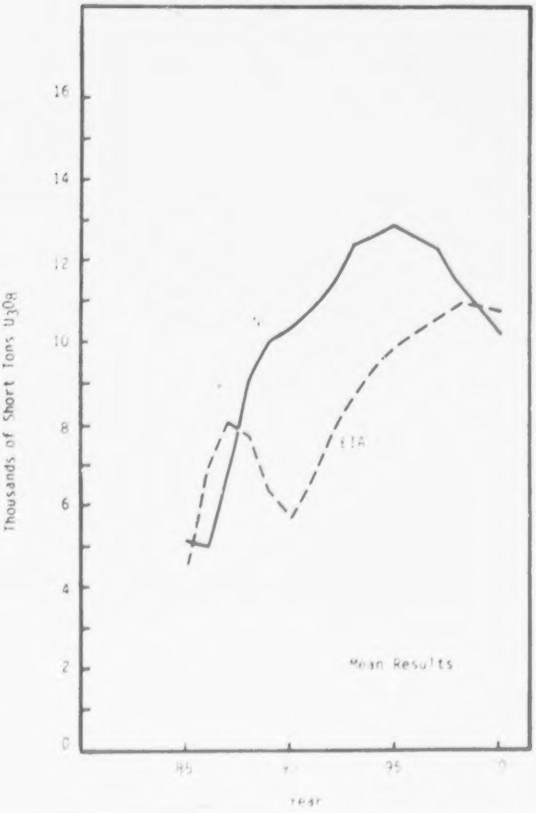
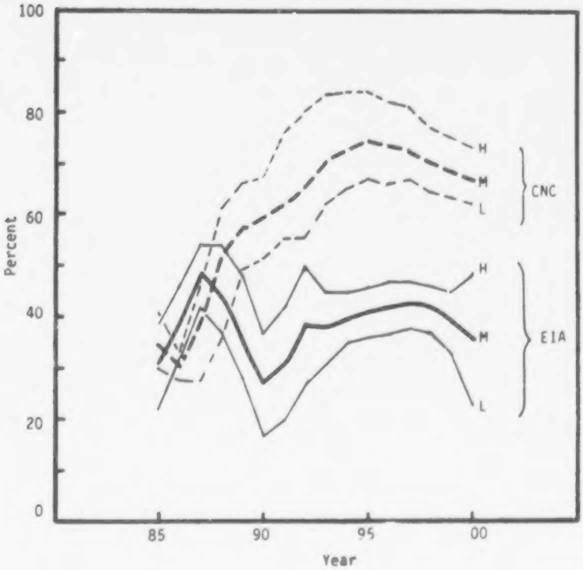


Figure 4.7-2

Projected Importation of Uranium
EIA and CNC

Percent of Total Demand



CNC wants to emphasize that these analyses of potential import penetration into the U.S. may overstate the actual future level of foreign source uranium commitments. Domestic utility buyers tend to view domestic and foreign source uranium somewhat differently due to assurance of supply concerns. In general, domestic utilities prefer U.S. source uranium, all other factors being equal (particularly price). Each utility addresses supply reliability issues during uranium procurement from its own perspective. Long term uranium supply commitments tend not to be based solely on economic factors, therefore, the ultimate penetration of foreign source uranium will depend upon complex interactions and assessments of commercial terms and supply reliability.

4.8 Uranium Market Price

The EIA defines market price in the glossary of their report as "Prevailing price level in the uranium market at or near time of delivery. Generally reflects spot price as mutually agreed upon by the contracting parties or independently determined by an unbiased outside arbitrator". This definition does not reflect the uranium price projected by the EUREKA model. The uranium "market" price projected by the EUREKA code is the initial year price for a multi-year supply contract of domestic source uranium with deliveries commencing about two years following the supply agreement. For example, if a EUREKA run gives a price of \$35 per pound U_3O_8 in the year 1987, it should be interpreted as the initial year base price in today's dollars for a multi-year supply agreement executed in 1987 with deliveries commencing about 1989. The actual delivered price to be paid under the supply agreement during the life of the contract will depend upon the price adjustment provisions (escalation) negotiated by the parties. The domestic version of EUREKA does not project the spot market price at time of delivery.

Uranium market price projections for the period 1984-2000 developed by EIA are shown on Figure 4.8. The price (mean level) remains depressed until 1986 when strengthening commences. The market price increases stedily into the early 1990's when it generally levels off until 1995-1996. Significant strengthening then occurs over the latter half of the 1990's.

EIA utilizes arithmetic averaging to arrive at its mean value while the low and high values represent the 95% confidence level. As can be seen on Figure 4.8, the EIA lower and upper boundaries begin to diverge significantly from the mean after only a few years into the forecast period. The price spread reaches $50/pound by 1990 and almost $100/pound by the year 2000. This divergence clearly emphasizes the uncertainties of the future uranium price, however, such a range tends to lessen the projection's usefulness.

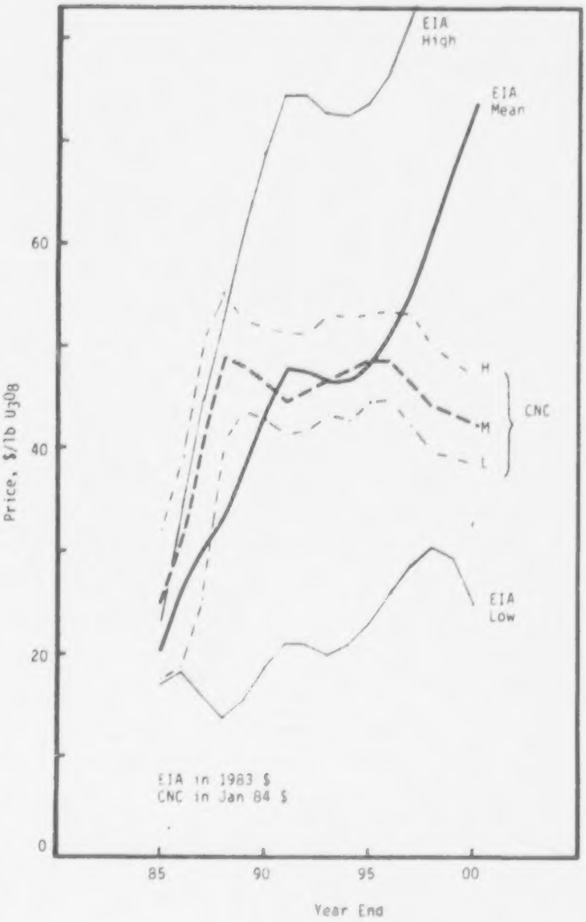
CNC's uranium market price projection resulting from the assumptions previously discussed is also presented on Figure 4.8. CNC incorporates probabilistic techniques to express its price projections. Such treatment provides a clearer representation of possible price trends and aids in the interpretation of uncertainties.

CNC's analytical results suggest a stronger price recovery in the late 1980's than does EIA. The CNC and EIA mean projections are in close agreement over the period 1990-1995 but then diverge substantially as EIA projects the beginning of another price rise. Although CNC's utilization of probabilistic processing techniques results in a "tighter" band around the mean forecast, the mean uranium price projections are reasonably comparable particularly in trends between now and 1995.

Figure 4.8

Projected Uranium Market Price

EIA and CNC



4.9 Net Demand for Domestic Source Uranium

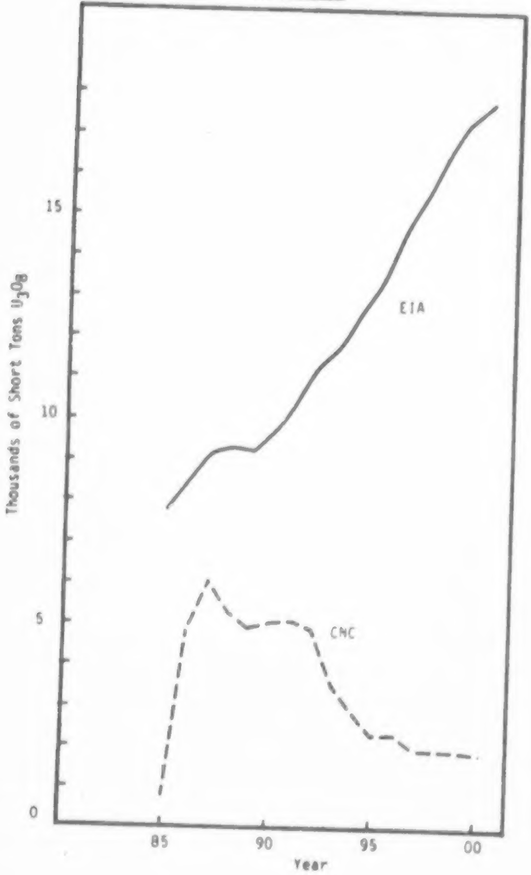
The EUREKA code calculates the net demand for U.S. source uranium for each year of the projection. Net demand is determined by deducting the import-export balance from the aggregate U.S. uranium demand. In addition, inventory accumulation or disposal is taken into account. Therefore, net demand can be viewed as the production level necessary from the domestic producers to satisfy that portion of total demand not filled by imports or inventory.

Figure 4.9 depicts the CNC-derived mean net demand as well as EIA's mean projection of domestic uranium production. In the near-term (through 1986-1987), actual production levels will probably approximate the levels projected by EIA. However, in the longer-term, the domestic industry will be called upon for steadily decreasing production levels. Again, actual production may exceed the net demand projections with any surplus becoming excess inventory for either producers or utilities.

EIA's projection of domestic production concludes that the U.S. industry can expect annual production levels of 26-44 million pounds (13,000 to 22,000 ST) U_3O_8 by the year 2000. CNC only projects a mean domestic production of 4 million pounds (2,000 ST) at that time.

Figure 4.9

Projected Annual Demand for Domestic Production
EIA and CNC



4.10 National Security Emergency Analysis

The Presidential Report examines the implications of a "national security emergency" which postulates that the United States and Canada would be "cut off" from the uranium supplies of the rest of the world. This scenario assumes that the U.S. and Canada are prevented from importing or exporting uranium but would collectively share the uranium production within the two countries. This assessment concludes that the U.S. and Canada have sufficient resources and production capability to satisfy the combined uranium needs of the two countries probably through the 1990's.

CNC believes that this analysis of the potential availability of Canadian uranium to meet U.S. uranium needs in the event of a national emergency fails to consider several important issues. Certainly, Canada and the U.S. contains substantial quantities of resources. Also, significant uranium production capability currently exists particularly in the U.S. However, that "excess" production capability will rapidly erode as producers shut-down facilities and enter into decommissioning and reclamation as dictated by the state and federal regulations which govern uranium production facilities. It is highly doubtful that the state authorities will allow the open-ended shutdown (without decommissioning) of uranium mines and mills. Pressure will likely be applied to decommission and reclaim after a relatively short period of inactivity. Thus, there would be a significant lead time required in order to effect any significant increase in production.

The EIA assessment also is generally silent on the price implications surrounding the national security scenario. The need to rapidly increase production from existing facilities will lead to sales price requirements well above those prevailing in the current and near term market. The material could be made available but at a higher price, probably substantially higher.

The scenario assumptions are questionable when the current distribution of Canadian uranium commitments is examined. The Canadian government reported that as of the end of 1983, Canadian producers were obligated to deliver a total 261.5 million pounds U_3O_8. The geographic distribution of these forward commitments show that European nations are the largest purchasers of Canadian uranium with 43.8% of the total while Japan is scheduled to receive 22.6% of the total. U.S. buyers are committed to take 28.5% of the future uranium deliveries. Therefore, the basic assumption that Canada will not make deliveries to other Free World countries (for whatever reason) seems to be questionable.

In summary, the National Security Emergency analysis requires a more comprehensive treatment due to its potential importance.

4.11 Installed U.S. Uranium-Fueled Electric Generating Capacity and Uranium Demand - CNC's Low Case

As previously discussed, CNC developed a "low case" installed capacity forecast which reaches only 94 GWe in the year 1990 and then gradually decreases to 89 GWe by the end of the century. The domestic uranium demand under the Low Case assumptions peaks at 29.3 million pounds U_3O_8 in 1987 and then declines to 27.6 million pounds U_3O_8 in 1990 (and 1995). The U.S. uranium requirements fall to 24.3 million pounds U_3O_8 by the year 2000.

The Low Case assumptions generally aggravate the analytical results in virtually all areas as compared to the projections using all the scenarios. Uranium market price remains below $30/pound until 1988 when a rather abrupt price rise to the low $40/pound range occurs. The uranium market price then remains in the range of $41 to $46/pound throughout the remainder of the century.

The absolute level of foreign-source imports fails to reach the annual totals from the full array of cases. However, uranium imports as a percentage of annual demand are projected to reach almost 83% by the mid-1990's.

Net demand on the domestic uranium supply industry peaks at just over 5,000 short tons U_3O_8 in 1988 but then plummets below 1,000 short tons per year commencing in 1993.

CNC believes that the full array of scenarios considered reflect the most probable direction in the uranium market at this point in time. However, a continuation of recent negative influences on the supply and demand balance could tend to force trends in the direction of the Low Case. This situation must be continuously monitored and market projections updated to reflect then-current trends in crucial variables.

- End -

Senator DOMENICI. Senator, shall we establish our own rules as we go along? If either of you have questions as we move through, you are free to ask them. If not, we will go on through the witnesses and we can come back to any of them we like when we are finished.

I would like to finish by 4 o'clock, but clearly we don't have to, but I have to leave at about 4 p.m., so Senator, do you want to proceed or do you want to ask the questions?

Senator SIMPSON. Mr. Chairman, I must go, too. I have to get on with the conference committee preparation of immigration which is bad enough in its prospects.

Just one question, and then I will put the rest of them in writing if I may, and thank you, Jeff, too, and I want to say, too, that you have been working just as diligently on this issue that greatly affects your State, and I admire that, but all of you here in some way or another represent companies that have uranium mills or mines that are on standby. In some way you are involved I have a hunch, awaiting improvement in market conditions.

Is it anywhere reasonable to expect under any circumstances that if current trend continues as you all know it to be, that you will remain in business much longer?

Senator DOMENICI. Why don't we start?

Mr. STEVENS. I might just comment, Senator Simpson, that each of us probably are in a little different position based on the kind of contracts we have got, but certainly I think most everybody agrees that under circumstances as they are today, getting new commitments, new contractual commitments, on the basis of the market at what is conceived as the market price today is practically impossible.

Senator SIMPSON. Is there anyone that does not concur with that for the record?

Mr. RITCHIE. Senator Simpson, Pathfinder Mines intends to stay in business even though at a very low level on the basis of contracts that we have both domestically and with foreign producers, specifically in the Far East, and even though our employment level is down to less than 400 people, down from a high of 1,750, we endeavor, will endeavor to maintain that level for as long as possible into the 1990's, and be in a position to respond should the market conditions improve and should there be an upturn in requirements.

Senator SIMPSON. Thank you, Mr. Chairman. In my questions I will develop the theme that, you know, you can be in a standby or in low production area, and few recognize at least out here what it takes to bring that operation back on line. They always say around here well, if things pick up you can just come back in, but after you go through the bonding requirements and mothballing and things, this and that, that is not that simple.

In fact, it is absurd to think it can happen. Those are things I will develop, and thank you, Mr. Chairman.

Senator DOMENICI. Thank you very much, Senator. Let's proceed. Mr. Alesio, we will be glad to hear from you.

STATEMENT OF WILLIAM G. ALESIO, VICE PRESIDENT AND GENERAL MANAGER, URANIUM, UMETCO MINERALS CORP., DANBURY, CT

Mr. ALESIO. Mr. Chairman, Senator, my name is Bill Alesio. I am vice president and general manager of Umetco Minerals, a subsidiary of Union Carbide Corp.

I very much appreciate the opportunity to comment briefly on the current and projected status of the U.S. uranium mining and milling industry.

If I might back up to the question you just asked, Senator Simpson, just a fact that on the panel here with the exception of Mr. Ritchie, we all represent companies whose main interest is not uranium, and therefore the question of willingness of our companies to stay in the business if conditions continue as they have in the recent past is of greater significance where the major thrust of a company is not uranium.

Senator SIMPSON. That is an excellent distinction. Thank you.

Mr. ALESIO. Proceeding, we believe that the depressed conditions of the industry in 1983 were described in the DOE's May 1984 review of the industry. As has already been indicated, further deterioration has taken place, a lot of which was described by Mr. Stevens in his chart presentation.

Additional factors, one, the price of the so-called spot market stood at $17.50 at the end of August 1984. We estimate this is less than half of the average total cost of conventional U.S. production, and of course, as was pointed out earlier, additional reactor cancellations have occurred. I might add here also, Senator, that in separate correspondence with the Department of Energy, we at Carbide were advised that the additional cancellations would indeed be considered when the Secretary's report which is due out soon is issued. Earlier testimony suggested that might not be the case. I bring that up for that reason. .

Clearly, Mr. Chairman, ours is a severely depressed industry by any definition, a face which is forcefully brought home to us at Union Carbide. After 36 years of supplying uranium requirements of this Nation, we have been forced to suspend operations and place our mines and mills on standby as we await an uncertain future. Whereas as recently as 1978 we employed over 1,100 people in the uranium business, our work force will soon be reduced to less than 200 people, a number required to keep the mines and mills in reasonable state of readiness to resume operation should the need arise.

While our 900 unemployed workers or even the 17,000 unemployed in the total industry may seem small in the national context, the economic impact on those sparsely settled areas in Colorado, Wyoming, and Utah where our operations are located is especially severe, and the same, of course, is true in New Mexico as you well know.

Umetco's situation is not at all unique since it is apparently shared by all of the surviving uranium producers, or almost all. Even our new record low production level does not totally reflect the severely depressed state of the industry in that almost all of current production is dedicated to satisfying delivery requirements of old contracts. These contracts, because they were based on historical cost-related pricing, represent the liferafts which have permitted a few survivors to stay afloat in recent years. These old contracts are expiring, Mr. Chairman, and we find ourselves unable to compete in acquiring new business because of the low-priced offerings of foreign producers, some of whom are blessed by nature with higher ore grades, and several of whom are at least partially owned or subsidized by their government.

During the period 1982, 1983, according to DOE's marketing surveys for those years, domestic buyers' commitments for future delivery increased by 44 million pounds, of which a staggering 80 percent were commitments to foreign sources. The effect of these more recent transactions plus those of foreign contracts previously in existence are impacting heavily on the current market and seriously threaten the future.

Our prospect for future participation in the domestic market are similarly discouraging. In the next decade, DOE's survey indicates that U.S. facilities will require some 345 million pounds of U_3O_8. Only 35 percent or 120 million pounds of this requirement was not yet under contract as of January 1. In order to hold the overall import level at 37½ percent, U.S. producers must somehow capture contracts for 76 million pounds of the yet unfilled 120-million pound requirement.

As Senator Bingaham surmised earlier, recent events clearly indicate that this level of participation will be impossible to achieve in a free-flowing market.

Even more discouraging is the fact that over 80 percent of this available market does not begin until 1988, 1989 at the earliest, leaving domestic producers the problem of somehow surviving a 4- to 6-year depression and then actively competing with foreign producers for the U.S. market. We cannot share the optimism expressed by DOE in their May review in projecting that a stronger upward trend in prices beginning in the mideighties will somehow carry us through this critical 4- to 6-year period and then permit our active reentry in the 1990's.

Even if DOE's optimistic price upturn were to occur as projected in the Presidential report, we estimate that free market prices would not catch up with domestic costs until the mid-1900's.

The burning issue then continues to be the conditions of the recent past have already forced many domestic producers to abandon the business, and the projected outlook strongly suggests that others will soon follow. If so, assuming the general view is indeed the law requires that a viable uranium industry is essential to our national well-being, the very urgency of the matter dictates that solutions must be found now. Further studies and delays are not solutions, Mr. Chairman, for the patient will probably die while the team of doctors is still determining if he is really ill.

Recognizing that import restrictions are not favored by this administration, we have recently suggested a plan whereby DOE would be required to acquire from the surviving domestic producers an energy emergency stockpile equal to a 3-year forward supply, purchases to be made over a 6-year period with payment spread over perhaps twice that period. We believe that such a plan would not only provide the domestic industry with a lifeline during the next 4 to 6 critical years, but would also provide the Nation with an emergency reserve similar to the strategic petroleum reserve as protection against future disruptions of supply.

While we recognize the cost implications of such a program, we believe that it can be justified as preferable to other proposed methods in that it would not directly affect international trade relations or the consumer's cost of electricity.

In conclusion, Mr. Chairman, the domestic uranium industry is in serious jeopardy. Absent some form of Government action, it is unlikely to survive.

The domestic nuclear power industry for all of its setbacks will be called upon to supply some 13 to 20 percent of the Nation's electrical power throughout this century. To us at least it makes no more sense to be dependent upon a relatively few foreign sources of uranium to fuel these reactors than it does to be excessively dependent on foreign sources of oil. Energy independence should be an avowed goal of the national energy policy.

I would like to thank you, Mr. Chairman, and the committee for your attention and for the opportunity to testify on a matter of great concern to all of us.

[The prepared statement of Mr. Alesio follows:]

STATUS OF THE UNITED STATES URANIUM MINING AND MILLING INDUSTRY

HEARINGS

before the

ENERGY RESEARCH AND DEVELOPMENT SUBCOMMITTEE

of the

COMMITTEE ON ENERGY AND NATURAL RESOURCES

U. S. SENATE

September 12, 1984

Statement of William G. Alesio
Vice President & General Manager
Uranium, Coal, Gas, & Oil
Umetco Minerals Corporation

September 12, 1984

Statement of William G. Alesio
Umetco Minerals Corporation

Mr. Chairman and members of the committee, I am Bill Alesio, Vice President and General Manager of Uranium, Coal, Gas and Oil for Umetco Minerals Corporation, a subsidiary of the Union Carbide Corporation. I appreciate this opportunity to comment briefly on the current and projected status of the U.S. uranium mining and milling industry.

We believe that the depressed conditions of the industry in 1983 were accurately depicted in DOE's May 1984 Review of the Industry. We are certain that the DOE would also agree that the situation at mid-1984 has further deteriorated as indicated by the following:

- Domestic production this year is likely to be less than 8,000 short tons of U_3O_8, the lowest level since 1957 and less than half of the uranium required annually for fueling U.S. reactors.

- Additional mill closings are imminent, or have already occurred; those mills still operating do so at less than capacity with the result that only 25% of the nation's total conventional milling capacity will be utilized.

- Employment, capital investment and exploration expenditures will record levels even less than the record lows of 1983.

- Prices in the "spot market", stood at $17.50 at the end of August 1984, less than half of the average total cost of conventional U.S. production.

Clearly, Mr. Chairman, ours is a severely depressed industry by any definition, a fact forcefully brought home to us at Umetco. After 36 years of supplying the military and civilian requirements of the nation, we have been forced to suspend operations and place our mines and mills on standby as we await an uncertain future. Where, as recently as 1978, we employed over 1,100 geologists, miners and mill hands, our work force will be reduced to less than 200 people to keep the mines and mills in a reasonable state of readiness to resume operation should the need arise. While our 900 unemployed workers, or even the 17,000 unemployed in the U.S. uranium industry, may seem small in a national context, the economic impact on those sparsely settled areas in Colorado, Wyoming and Utah where our operations are located is especially severe.

Umetco's situation is not unique since it is apparently shared by all of the surviving uranium producers. Even our new record-low production level does not totally reflect the severely depressed state of the industry in that almost all of current production is dedicated to satisfying the delivery requirements of old contracts. These contracts, because they are based on historical, cost-related pricing, represent the "life rafts" which have permitted a few survivors to stay afloat in recent years. These old contracts are expiring, Mr. Chairman, and we find ourselves unable to compete in acquiring new business because of the lower-priced offerings of foreign producers, some of whom are blessed by nature with higher grades and several of whom are at least partially owned or subsidized by their governments.

During the period 1982-1983, according to DOE's Marketing Surveys for those years, domestic buyer commitments for future delivery increased by 44 million pounds, of which a staggering 80% were commitments to foreign sources. The effects of these more recent transactions plus those of foreign contracts previously in existence are impacting heavily on the current market and seriously threaten the future.

Our prospects for future participation in the domestic market are similarly discouraging. In the next decade (1984-1993), DOE's 1983 Survey indicates that U.S. utilities will apparently require some 345 million Lbs. of U_3O_8. Only 35%, or 120MM Lbs., of this requirement was not yet under contract on January 1st. If an overall import level of 37 1/2% is our "peril point", U.S. producers must somehow capture contracts for 76 million Lbs. of the yet unfilled 120MM Lb. requirement in order to retain a 62 1/2% domestic share. Recent events clearly indicate that this level of participation will be impossible to achieve in a free flowing market.

Even more discouraging is the fact that over 80% of this available market does not begin until 1988, at the earliest, leaving domestic producers the problem of somehow surviving a five year depression and then actively competing with foreign producers for the U.S. market. We cannot share the optimism expressed by DOE in their May Review in projecting that "a stronger upward trend in prices beginning in the mid-80's" will somehow carry us through this critical 5 year period and then permit our active re-entry in the 1990's. Even if DOE's optimistic upturn were to occur as projected, it is unlikely that free market prices will catch up with domestic production costs until the mid'90's.

The burning issue then continues to be that conditions of the recent past have already forced many domestic producers to abandon the business and the projected outlook strongly suggests that others will soon follow. If so, and assuming the general view, as indeed the law requires, that a viable uranium industry is essential to our national well-being, the very urgency of the matter dictates that solutions must be found now. Further studies and delays are not solutions, Mr. Chairman, for the patient will probably die while a team of doctors are still determining if he is really ill and, if so, of what cause.

We have recently suggested a possible solution wherein DOE would acquire from the surviving domestic producers an Energy Emergency Stockpile equal to a three year forward supply. Purchases would be made over a six year period with payments spread over twice that period. We believe that such a plan will not only provide the domestic industry with a "life-line" during the next 4 to 6 critical years, it will provide the nation with an emergency reserve similar to the Strategic Petroleum Reserve as protection against a future disruption of supply. While we recognize the cost implications of such a program, we believe that it can be justified as a more preferable solution in that it would not directly affect international trade relations and the consumers cost of electricity.

In conclusion, Mr. Chairman, the domestic uranium mining industry is in serious jeopardy. Absent some form of government action, it is unlikely to survive. The domestic nuclear power industry, for all its setbacks, will still be called upon to supply some 13 to 20% of the nation's electrical power throughout this century. To us, at least, it makes no more sense to be dependent upon a relatively few foreign sources of uranium to fuel these reactors than it does to be excessively dependent on foreign sources of oil. Energy independence should be an avowed goal of a national energy policy.

I would like to thank you, Mr. Chairman, and this committee for your attention and the opportunity to testify on a matter of great concern to us all. I will be happy to answer any questions you might have at this time.

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Senator DOMENICI. Thank you, Mr. Alesio. Do you know the Colorado Nuclear people that did the evaluating?

Mr. ALESIO. Yes; I am familiar with the people.

Senator DOMENICI. Are they generally pessimists or optimists or how?

Mr. ALESIO. I would classify them as realists as compared with the DOE in this case.

Senator DOMENICI. Clearly they are not generally known in the industry and among those who use their services as producing extremely pessimistic evaluations of economic conditions and the like, are they?

Mr. ALESIO. That is correct. In periods during the past we have taken positions that some of their estimates are out on the optimistic side.

Senator DOMENICI. Mr. Lang.

STATEMENT OF EUGENE A. LANG, SENIOR VICE PRESIDENT, ROCKY MOUNTAIN ENERGY CO., BLOOMFIELD, CO

Mr. LANG. Mr. Chairman, my name is Eugene A. Lang, and I am senior vice president of Rocky Mountain Energy Co.

Rocky Mountain Energy is a Denver-based subsidary of the Union Pacific Corp. We operate the company in the southern Powder River Basin of Wyoming and conduct uranium exploration throughout the United States.

Mr. Chairman, I too would like to thank you for calling these hearings to review the status of the uranium industry. You may recall, Mr. Chairman, that another representative of RME sat at this table 3 years ago today and testified on the status of the U.S. uranium industry. Mr. Gibbs said at that time basically two things—one, that the U.S. uranium industry is not viable; second, that the Federal Government was not fulfilling its responsibilities in maintaining a viable industry as required by the Atomic Energy Act.

I am here today to reiterate what Mr. Gibbs said then. I believe other testimony received today adequately sets forth the further deterioration of the industry since we delivered this message 3 years ago. Suffice it to say contracting by U.S. utilities for foreign uranium has increased. Based on a recent study, imports could reach over 50 percent by the late 1980's. During the same period, productivity and exploration activities of the U.S. industry has all but collapsed. We are now at a point where the odds are very much against the United States being in a position to meet its long-term uranium needs from secure sources here at home.

In addition to the bone-crunching competition from abroad, competition that has brought this industry to its knees, we find DOE is bringing uranium from the stockpile into the enrichment cycle at transfer prices of less than $10 per pound as a way to handle the treatment of the split tails. When DOE had the opportunity to assist the uranium producers by offering the utilities a true variable tails option that balanced enrichment charges and uranium prices, they effectively eliminated that option by imposing a surcharge for enrichment. In effect, the surcharge operates as a tariff, stifling what could have been a 15- to 20-percent increase in demand growing out of the increase in tails.

Going to the split tails route and using $9.50 uranium from the stockpile, they have chosen to increase their own competitiveness at the further expense of the producer.

Again, I am not here today to ramble about the plight of the industry, the reduction of nuclear power projections, or the incredible regulatory morass we must wade through.

I am here, Mr. Chairman, to ask you and other members of the committee why the Federal Government continues to ignore the statutory mandate given in 1964 to maintain a viable uranium industry.

Recently the President sent his report to Congress, the "United States Uranium Mining and Milling Industry: A Comprehensive Review," which was prepared by DOE. If it does nothing else, it clearly signals that the Secretary's report will say the uranium industry is viable. No one can reasonably draw such conclusions from the facts contained in the President's report. The Secretary's report will contain 1983 facts which are even worse. We wonder why DOE insists that our industry is viable.

By law, the Department of Energy is to help maintain a viable U.S. industry, not subvert it. If Congress still believes in its policy of a viable domestic industry at the very least DOE should be sent to a neutral corner. In our opinion, DOE must stop bringing the uranium into the market from its stockpile. We shouldn't allow the utilities the option to higher tails assay without the surcharge.

There are other steps that the Government could take if it wants to ensure our industry's survival. I believe, for example, that the Special Trade Representative could negotiate limits on imports. He already has that power. It is only the inclination he doesn't seem to have. We would applaud such voluntary actions.

If they are not forthcoming, Congress must choose. Change the policy of requiring a viable industry, or impose actions necessary to achieve it.

Thank you.

[The prepared statement of Mr. Lang follows:]

Prepared Statement of Eugene A. Lang, Senior, Vice President, Rocky Mountain Energy Co.

Mr. Chairman and Members of the Subcommittee:

My name is Eugene A. Lang, and I am Senior Vice President of Rocky Mountain Energy Company.

Rocky Mountain Energy Company (RME) is the denver-based mining subsidiary of Union Pacific Corporation. RME is principally engaged in the exploration and development of Union Pacific's coal, uranium and trona reserves. During recent years, RME has had a role in developing U.S. uranium reserves through the operations of the Bear Creek Uranium Company in the Southern Powder River Basin in Wyoming. In addition, RME has conducted uranium exploration throughout the United states.

Mr. Chairman, I would like to thank you for calling this hearing to review the status of the U.S. uranium industry.

You may recall, Mr. Chairman, that another representative from Rocky Mountain Energy Company sat at this table (almost exactly) three years ago today and testified on the status of the U.S. uranium industry. Mr. Gibbs said at that time basically two things:

(1) THE U.S. URANIUM INUDSTRY WAS NOT VIABLE; AND

(2) THE FEDERAL GOVERNMENT WAS NOT FULFILLING ITS RESPONSIBILITIES IN MAINTAINING A VIABLE URANIUM INDUSTRY AS REQUIRED BY THE ATOMIC ENERGY ACT.

I AM HERE TODAY TO REITERATE WHAT MR. GIBBS SAID THREE YEARS AGO. I WILL NOT BELABOR THE DETAILS OF THE STATUS OF OUR INDUSTRY. I BELIEVE OTHER TESTIMONY RECEIVED TODAY ADEQUATELY SETS FORTH THE FURTHER DETERIORATION OF OUR INDUSTRY. SUFFICE IT TO SAY, HOWEVER, SINCE WE DELIVERED THIS MESSAGE THREE YEARS AGO, CONTRACTING BY U.S. UTILITIES FOR FOREIGN URANIUM HAS INCREASED. BASED ON A RECENT STUDY BY NUKEM, IMPORTS COULD REACH 50% BY THE LATE 1980'S. DURING THE SAME PERIOD, THE PRODUCTIVE CAPACITY AND EXPLORATION ACTIVITY OF THE U.S. URANIUM INDUSTRY HAS ALL BUT COLLAPSED. WE ARE NOW AT THE POINT WHERE THE ODDS ARE VERY MUCH AGAINST THE UNITED STATES EVER BEING IN A POSITION TO MEET ITS LONG-TERM URANIUM NEEDS FROM SECURE SOURCES HERE AT HOME.

IN ADDITION TO BONE-CRUNCHING COMPETITION FROM ABROAD -- COMPETITION THAT HAS BROUGHT OUR INDUSTRY TO ITS KNEES -- WE FIND DOE BRINGING URANIUM, FROM THE STOCKPILE, INTO THE ENRICHMENT CYCLE AT TRANSFER PRICES OF LESS THAN $10.00 PER POUND AS A WAY TO HANDLE THE TREATMENT OF SPLIT

TAILS. WHEN DOE HAD THE OPPORTUNITY TO ASSIST THE URANIUM PRODUCERS BY OFFERING UTILITIES A TRUE VARIABLE TAILS OPTION THAT BALANCED ENRICHMENT CHARGES AND URANIUM PRICES, THEY EFFECTIVELY ELIMINATED THAT OPTION BY IMPOSING A SURCHARGE FOR ENRICHMENT. IN EFFECT, THE SURCHARGE OPERATES AS A TARIFF STIFLING WHAT COULD HAVE BEEN A 15 TO 20% INCREASE IN DEMAND GROWING OUT OF THE INCREASED TAILS. BY GOING THE SPLIT TAILS ROUTE USING $9.50 URANIUM FROM THE STOCKPILE, THEY HAVE CHOSEN TO INCREASE THEIR OWN COMPETITIVENESS AT THE FURTHER EXPENSE OF THE PRODUCER.

AGAIN, I AM NOT HERE TODAY TO RAMBLE ABOUT THE PLIGHT OF OUR INDUSTRY, THE REDUCTION IN NUCLEAR POWER PROJECTIONS, OR THE INCREDIBLE REGULATORY MORASS WE MUST WADE THROUGH. I AM HERE, MR. CHAIRMAN, TO ASK YOU AND OTHER MEMBERS OF THE COMMITTEE, WHY THE FEDERAL GOVERNMENT CONTINUES TO IGNORE THE STATUTORY MANDATE GIVEN IN 1964 TO MAINTAIN A VIABLE U.S. URANIUM INDUSTRY?

RECENTLY, THE PRESIDENT SENT HIS REPORT TO CONGRESS - "UNITED STATES URANIUM MINING AND MILLING INDUSTRY - A COMPREHENSIVE REVIEW" WHICH WAS PREPARED BY DOE. IT CLEARLY SIGNALS WHAT THE SECRETARY'S REPORT WILL SAY -- "THE URANIUM INDUSTRY IS VIABLE." NO ONE CAN REASONABLY DRAW SUCH A CONCLUSION FROM THE FACTS CONTAINED IN THE PRESIDENT'S REPORT. THE SECRETARY'S REPORT WILL CONTAIN 1983 FACTS WHICH ARE EVEN WORSE. WHY DOES DOE INSIST THAT OUR INDUSTRY IS VIABLE?

By law, the Department of Energy is supposed to help maintain a viable U.S. uranium industry -- not subvert it. If Congress still believed in its policy of a "viable domestic industry," at the very least DOE should be sent to a neutral corner. DOE must:

- o Stop bringing uranium into the market from its stockpile; and
- o Allow utilities the option of higher tails assay without the surcharge.

There are also other steps the government could take if it wants to ensure our industry's survival. I believe, for example, that the Special Trade Respresentative could negotiate limits on imports. He already has the power to do it, only the inclination doesn't seem to be there. We would applaud such voluntary actions. If they are not forthcoming, Congress must choose: change the policy of requiring a viable industry or impose actions necessary to achieve it.

# # #

Senator DOMENICI. Thank you very much. Mr. Luke.

STATEMENT OF ROBERT LUKE, EXECUTIVE VICE PRESIDENT, SEQUOYAH FUELS CORP., OKLAHOMA CITY, OK

Mr. LUKE. Senator Domenici, I am going to submit my prepared testimony for the record and simply comment very briefly on a couple of things that the Government witnesses said.

In conjunction with my prepared testimony, I have already provided to your staff and to the committee staff a copy of a comprehensive report on the DOE enrichment policies and their impact on the uranium business which was prepared by Kerr-McGee with the assistance and help of Nuclear Resources International of Atlanta, GA. This report contains what we believe is a comprehensive set of recommendations which could work to the benefit of the domestic uranium business, ultimately to the benefit of the U.S. utility customer and consumer by lowering fuel prices, and also be to the benefit of the Department of Energy.

Let me say that a couple of things that were commented on in the question session with Mr. Boggs I think go to the heart of our problems with the enrichment business.

Mr. Boggs said very specifically in response to I believe one of your questions that the enrichment industry must survive and be competitive in order for the domestic uranium industry to have a chance for survival in the future.

What he failed to say, and I think should realize, is that that works both ways, that in fact without a reliable long-term supply of uranium, the enrichment investment of this country is of no value whatsoever, and what we would like to do is to bring these matters to his attention and to Secretary Hodel's attention such that we could work together toward having a viable U.S. enriched uranium fuels industry that includes both uranium and enrichment.

Another thing that was said during the question period was that you can expect a certain amount of friction between a supplier and a manufacturer, and I hope this committee realizes and you realize that this is a special situation between a supplier and a manufacturer. The Government in this case in fact operates a monopoly that sits between the uranium industry and its only market, and in this situation, the Government has not only legal but moral responsibilities to the uranium industry as a supplier.

With respect to the viability issue, we feel like that the current definition that the DOE would like to place on viability is that the industry could be dying or in fact be dead and if it is needed some time in the future, then by definition it is viable, which is certainly an unfair and unthinking definition of viability and how we might continue until that time in 1990 when industry is needed and when the DOE contends that we will be viable.

With those comments, I would pass.

[The prepared statement of Mr. Luke follows:]

TESTIMONY ON BEHALF OF SEQUOYAH FUELS CORPORATION AND QUIVIRA MINING COMPANY FOR THE ENERGY RESEARCH AND DEVELOPMENT SUBCOMMITTEE OF THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

SEPTEMBER 12, 1984

Mr. Chairman and members of the Committee, my name is Robert Luke. I am Executive Vice President of Sequoyah Fuels Corporation and Quivira Mining Company.

Mr. Chairman, the Department of Energy has adopted a new uranium enrichment contract and has announced plans for changes in enrichment plant operations which will make matters far worse than they already are for the domestic uranium industry. We strongly support the Department of Energy's basic effort to reduce the price of U. S. enrichment in order to meet foreign competition. However, if the DOE program is implemented as planned, it is likely to finish the U. S. uranium industry as an effective source of supply for at least five years.

We estimate that the enrichment contract changes now being negotiated by DOE will result in the elimination of approximately 100 million pounds of uranium demand between now and 1990. This is an amount of uranium three times greater than the entire uncommitted U. S. market over the same time frame.

Also, the new DOE contract imposes arbitrary restrictions and surcharges on enrichment customers that would otherwise purchase several million pounds of additional uranium each year.

Finally, the DOE has announced its intention to sell over the next five years more than fifty million pounds of uranium from the government stockpile through "split tails" operation of the U. S. enrichment plants.

Senator Domenici, perhaps DOE understands the implication of these policies on the uranium industry and has decided that what remains of our industry is expendable. I prefer to believe, however, that enrichment officials in the Department of Energy have failed to properly evaluate the impact of these enrichment policy changes on the domestic uranium industry and have focused instead only on government budget considerations and DOE's current problems in meeting foreign enrichment competition.

The government operates a domestic monopoly in enrichment that sits between the uranium industry and its only market. Because uranium and enrichment services can be economic substitutes, DOE officials need to be reminded that they have both a moral and legal responsibility to the uranium industry.

Natural uranium is of no value in U. S. power production until it has been processed in the government enrichment plants. Conversely, the enrichment plants are of no value without a dependable source of natural uranium supply. It is obvious that the future of U. S. enrichment is tied at least in part to the future of domestic uranium supply. Also, an economical and reliable supply of enriched uranium for the U. S. power program and defense needs is dependent on the health of both industries.

Mr. Chairman, the government enrichment contracts and operating plans are complicated. We have given the Committee staff a consulting report on this subject prepared by Nuclear Resources International of Atlanta, Georgia. With your permission, a copy of the Executive Summary and recommendations of this report will be attached to my prepared testimony for inclusion in the official record of these hearings.

The recommendations made in the NRI report include:

1. An immediately available choice of tails assays by enrichment customers without limits or surcharges (we understand the French are now offering enrichment on these terms to U. S. utilities in competition with DOE).
2. A freeze on further sales of government stockpile uranium.
3. Government purchase from domestic producers of any additional uranium requirements created from "split-tails" enrichment operations and "incrementally priced" enrichment sales.
4. Independent funding for centrifuge and laser enrichment research and development.

We earnestly believe this program, if undertaken by DOE, will reduce fuel costs to U. S. utilities and will initiate a recovery in the U. S. uranium industry. We also believe this program will give U. S. enrichment a better chance of meeting foreign competition in the future.

The uranium industry is sometimes accused of asking for new government programs rather than relying on free market forces. Mr. Chairman, our industry is inextricably tied to government enrichment policies since all of our production must pass through the enrichment plants. Our choice is not to do away with government programs impacting the uranium industry. Our only choice is to seek government enrichment policies that are fair to uranium producers. It's time the enrichment officials tried to pull in tandem with the uranium industry rather than use government monopoly powers to benefit enrichment at our expense.

Mr. Chairman, we have been working with a group of domestic uranium companies to prepare a more detailed joint statement on these issues. We have not completed this work, and request a reasonable period of time to supplement the record of these hearings with a further written statement.

I appreciate this opportunity to appear before this subcommittee today, and would be pleased to answer questions.

EXECUTIVE SUMMARY

Congressional concern over the viability of the domestic uranium industry resulted in the passage of legislation in 1983 that required the President to submit a comprehensive review of the domestic uranium industry in 1984 and for the Department of Energy (DOE) to report annually for the next ten years on the viability of the industry. The President's report prepared by DOE reflects the industry status as of the end of 1982 and thus does not accurately depict the far more distressed state of the industry that exists today. Estimated 1984 U.S. uranium production of 7000 short tons will be 30 percent less than 1983 production and only about 40 percent of U.S. requirements. In addition, at $17.50 per pound U_3O_8, the current spot price of uranium is at its lowest level in over 10 years, further confirming the depressed state of the uranium market and making long-term contracting practically impossible.

It must be objectively recognized that past DOE policies in enrichment have, in fact, greatly contributed to the present malaise in the uranium industry as well as the recent woes in DOE's own enrichment business. In 1984 DOE has been aggressively and, it appears, effectively trying to remedy its own situation with the introduction of the Utility Services (US) enrichment contract and changes in its operating and accounting procedures. However, in the process of addressing its own problems, DOE has essentially ignored the problems of the domestic uranium industry. Further, DOE's solutions for enrichment actually exacerbate the near-term problems in uranium.

The lack of a coordinated approach toward both enrichment and uranium is different from the integrated approach taken in the past when issues concerning uranium and enrichment were evaluated contemporaneously. This more recent development is significant when it is recognized that (1) Congress has given DOE the responsibility for assuring the viability of the domestic uranium industry and (2) DOE's enrichment policies can be structured to either benefit or harm the industry.

The way DOE's enrichment policy is currently being formulated, the domestic uranium production industry comes out a double loser. DOE has revalued its uranium stockpile at its original purchase cost in the 1960's (\$26.00/kgU--about half the current market value), and now plans to draw some 50 million pounds of U_3O_8 equivalent from this stockpile from 1985 through 1989 as extra feed for a split-tails mode of operation. Split-tails allows DOE to reduce the cost of SWU's by substituting cheap uranium for relatively expensive electricity. In the process DOE creates a new form of demand 50 million pounds higher than would otherwise exist without split-tails. However, by drawing upon its stockpile, DOE is precluding the domestic production industry from enjoying the obviously needed benefits that would occur from such increased demand.

DOE has put a Variable Tails Assay Option (VTAO) in its new US contract which, in theory should be good for the uranium industry but which, in practice, may turn out to be too little too late. Simply stated, VTAO allows DOE's utility customers to trade-off enrichment with uranium to optimize their fuel costs. A utility which has purchased uranium cheaply can, like DOE, substitute cheaper uranium for more expensive enrichment. At \$17.50/lb U_3O_8 and \$135/SWU (DOE's price under its new US contract), a utility would want to specify an optimal tails assay of 0.33w/o. At this tails assay, uranium feed requirements would be increased by 28 percent above those required by DOE's standard transaction level of 0.20w/o. In general, extra feed requirements created by VTAO would come either from the utility's inventory or be purchased in the open market. In either event, the domestic uranium production industry would be helped.

However, while putting VTAO in its new contract, DOE is not making VTAO immediately available to all customers, not making the VTAO upper limit (0.30w/o) high enough, and imposing a not-insignificant surcharge (up to 7 percent of the SWU price) when VTAO does become universally available for the first time in fiscal year 1987. The end result is to limit the use of uranium by DOE's customers to levels up to 9.5 percent lower than might otherwise apply and to defer what extra demand that would occur by two years. Thus, uranium is being penalized by DOE's new contractual terms on the one hand without enjoying the potential compensating adjustment inherent in DOE's new operational mode on the other.

As a standard conversion term, DOE is allowing one class of customers, those with Adjustable, Fixed-Commitment contracts, to unilaterally reduce their enrichment purchases by 10 percent in FY 1985 and by 25 percent in FY 1986 as long as they take at least 70 percent of requirements from DOE. Further, during negotiations of conversions to the US contract, DOE has opted to sacrifice additional near-term SWU sales in fiscal years 1984, 1985, 1986 and 1987 in return for securing additional SWU sales (in the form of "100 percent contracts") in the 1990's. The significance of DOE taking such an approach should be made clear. By DOE sacrificing near-term SWU sales commitments, near-term uranium requirements are being directly reduced as well. While these moves may be valid to help DOE's enrichment business, they definitely hurt the uranium industry, yet in no case is there evidence that DOE checked in advance on the deleterious effects of its current contracting policies on the uranium industry before implementing them.

Thus, not only is DOE not helping solve the near-term problems of the domestic uranium industry, but it is actually exacerbating the industry's current problems as it supplements its own long-term future enrichment business. If DOE through its enrichment operations is providing a service to the country and is at the same time responsible for assuring long-term supplies of uranium, it should not be enhancing the long-term sales of one at the expense of the near-term needs of the other. DOE should be moving aggressively, as it is, to streamline its operations, institute good management, cut costs, and maximize its market share. But in the process of saving itself DOE should also take steps to avoid further endangering the survival of the domestic uranium industry.

DOE needs to take an integrated approach to uranium and enrichment due to the fact that uranium and enrichment are to a degree substitutable and the Government has the responsibility to ensure that the nation's resources are efficiently used. It is important that a review of DOE's present and proposed contractual and operational policies in enrichment be conducted now, while DOE's policies for the future are being set, to determine whether these policies conform to past and present Congressional mandates with regard to uranium and enrichment.

The specific policies which should be reviewed include:

- DOE's proposed split-tails operation of the enrichment plants and the future use of the Government's uranium stockpile;
- the use of the variable tails assay option (VTAO) in the Utility Services (US) enrichment contract;
- the possible use of a marginal pricing scheme in selling enrichment services; and
- funding of enrichment research and development and capital expansion, and choices concerning future enrichment technology.

With regard to split-tails operation and the Government's stockpile of uranium, DOE should consider the following recommendations:

- the DOE enrichment plants should be operated at a tails assay at least as high as the weighted average transaction tails assay selected by its customers. This would prevent DOE from unnecessarily building up further inventories of natural uranium and using more electricity than necessary while reducing DOE's cash flow requirements;
- While uranium prices are low, DOE should consider operating its plants at a tails assay higher than the weighted average transaction tails assay (i.e., operate in a split-tails mode). In making this decision, DOE should consider the relative costs of electricity and uranium in selecting the optimum operating tails assay and, in turn, the amount of supplemental uranium feed required in each year;
- The additional supplemental feed for split-tails could amount to some 50 million pounds U_3O_8 equivalent in the period FY 1985 through 1989. This additional uranium should have been produced in the United States and should be purchased under competitive bidding in the open market from domestic sellers; and

- DOE should designate its current uranium stockpile of 157 million pounds U_3O_8 equivalent a national strategic reserve which should be frozen at its current level until (1) a decision is reached on the optimum level of this reserve to service the future needs of Government applications, and (2) the desired level of U.S. uranium production for viability is established.

With respect to VTAO, DOE should adopt the following recommendations:

- removal of the surcharge provision on the use of VTAO in order that the relative prices of uranium and enrichment not be distorted, ensuring an economically efficient use of each. The effect of eliminating this surcharge would be to increase uranium requirements by 2.5-3 million pounds per year in FY 1987 and beyond;

- make a surcharge-free VTAO immediately available to all customers to provide a stimulus for uranium demand while the market is so depressed. This action would increase uranium demand by roughly another 3 million pounds in each of FY 1985 and FY 1986 assuming an average tails assay of 0.28w/o versus 0.235w/o assay currently projected; and

- make VTAO available in the range of 0.20w/o to 0.35w/o, instead of the current upper limit of 0.30w/o.

DOE is considering a proposal to price 30 percent of its enrichment sales at its marginal cost of production. DOE's marginal price has been estimated to be as low as $60/SWU--$75/SWU below its current base price of $135/SWU under the US contract. On this issue we recommend:

- DOE should implement marginal pricing. In fact, by law DOE is required to only recover its costs and is prohibited from making a profit. The $135/SWU price was selected to recover all DOE's costs with a 52.5 percent recapture of its previous sales. Based upon letters of intent and expressions of interest to convert, DOE can already see that it will surpass that point with both its domestic and foreign customers and that DOE will gain at least 72 percent. Thus, DOE will have no choice but to offer marginal price. The end result in our opinion will dramatically help DOE win back the vast majority of its previous business and at least hold, if not increase, its previous market share.

- In implementing marginal pricing, DOE should do it in such a way as to benefit both near-term as well as long-term sales of U.S. enrichment and uranium; and

- DOE should accomplish this goal by setting the marginal price level not necessarily at its lowest possible level of $60/SWU but at such higher level, perhaps $95/SWU, which would still allow DOE to both (1) effectively compete and capture its enrichment sales and (2) to collect additional revenue to finance the purchase of domestic-origin uranium for a split-tails program.

- Foreign customers of DOE should not be expected to help finance the viability of the U.S. uranium production industry through their purchases of SWU from DOE. Therefore, the lower true marginal price, unadjusted for purchases of domestic uranium, should be charged to foreign customers. With an unadjusted marginal price of $60/SWU, DOE's overall price for foreign sales would be $99.38/SWU--low enough to compete effectively anywhere in the world.

Other recommendations include:

- an improved procedure for funding of DOE's research, development, and capital expansion in enrichment;

- establishing the position of a Deputy Assistant Secretary for Uranium Supply in the Office of Nuclear Energy in order that uranium interests be properly considered in future policy decisions; and

- apprising the domestic uranium industry of the ways in which future enrichment technology choices will affect uranium requirements and supply.

In conclusion, we believe DOE should at least compensate for the negative effects on the uranium industry of its near term SWU relief program by allowing immediate, free, and unrestricted VTAO and by buying the U_3O_8 it will need for supplemental feed for split-tails between 1985 and 1989 from the open market. The revenues to cover these purchases should be included in a competitive SWU price which would be lower than today's price even after inclusion of the component for these extra feed purchases.

These recommendations are only small adjustments when viewed in the total context of all the strong positive changes DOE has made, and is still contemplating making, in the management of its enrichment enterprise. As such they are eminently do-able and should be incorporated into the overall program now while DOE is firming up its basic future policies.

There is no way the U.S. industry can survive for the next five years on existing contracts and the 32.6 million pounds of unfilled requirements reported by the U.S. utilities to EIA in January 1984. Furthermore, as a result of DOE's negotiating special relief in 1984 to 1987 for utilities with excess SWU, even this value will be significantly lower when EIA conducts its next survey in January 1985. A free and immediate VTAO and supplemental feed purchases for split-tails from private industry would add 15 and 50 million pounds U_3O_8 to demand, respectively, over the next five years. This new demand of 65 million pounds, when added to unfilled requirements and existing contracts, can represent a beginning to a solution to the industry's problems.

The need for a comprehensive approach to solving uranium's problems has never been greater and should be addressed in a forthright, timely and effective manner. If the domestic uranium production industry could provide the extra feed needed for true VTAO and for DOE's split-tails program, it would significantly improve the current severely depressed state of the industry and its price structure. Higher spot prices for uranium would lead, in turn, to a resumption of long-term contracting by U.S. utilities with domestic uranium producers at price levels which would support a more viable production industry.

These recommendations are made in a spirit of cooperation in an attempt to provide a comprehensive approach to solving some obviously difficult problems. We trust they will be received and studied in the same collaborative spirit with which they were prepared and submitted.

Quivira Mining Company
Kerr-McGee Corporation

Nuclear Resources International, Inc.
September 1984

Senator DOMENICI. Thank you very much. Mr. Hancock, we welcome you and look forward to your testimony.

STATEMENT OF NOLAN W. HANCOCK, CITIZENSHIP-LEGISLATIVE DIRECTOR, OIL, CHEMICAL & ATOMIC WORKERS INTERNATIONAL UNION, WASHINGTON, DC

Mr. HANCOCK. Thank you, Mr. Chairman. I appreciate and thank you for holding these hearings here today.

My name is Nolan Hancock, and I am citizenship-legislative director of the Oil, Chemical & Atomic Workers International Union. I appreciate the opportunity to testify on behalf of the OCAW concerning DOE's recent report.

OCAW is the primary representative of workers employed in the energy-producing companies with the membership exceeding over 120,000. Our union represents some 10,000 workers in the nuclear industry, but only a few of our members are left in the production, extraction, and mining of uranium of yellow cake.

Mr. Chairman, it does not take a lot of fancy statistics to understand the current condition of our domestic uranium industry. That condition is awful.

Our people are the first ones to recognize that as they are laid off and the impact that it has on our members, and I could tell you some tragic stories that you have already heard in your home State in the Grants, NM, area. Over three-quarters of the work force has been laid off, and as I said, that includes hundreds of our own members.

In 1979 at the peak of employment, 17 mines were operating in the 2 counties around, McKinley and Cibola Counties, around Grants, NM, area, and only 2 of those mines are left in operation and production today. The situation is catastrophic in many of those communities of New Mexico, Utah, Colorado, and attached is a graph that you have already seen showing the nosediving of both production and employment.

Needless to say, that has had a direct effect on the families of the employees and the community as a whole.

The potent combination of high unemployment and community deterioration ultimately and unfortunately leaves in its path a terrible human toll, visible by an increasing rate of alcoholism, suicides, divorce rates, family problems. It is the opinion of OCAW that the magnitude of these consequences should not go unnoticed. When selecting the criteria to be used in determining the viability of an industry, they ought to be given the highest priority.

DOE's Presidential report pays some lip service to the uranium industry's current nonviable state, but then conjures up a rosy forecast of a steady growth. That forecast really comes as a shock to us. You have seen the graphs that Colorado Nuclear have put together, and I won't elaborate on that, but I want to say, Mr. Chairman, that most of the new contracts for uranium are for uranium produced abroad, and you have heard the reason, so I won't need to elaborate on that, but DOE tries to claim that the reason for U.S. industry's death is not imports. DOE's position is indefensible. The data shows that the imports are now dominating our market and Colorado Nuclear indicates that this trend will continue.

Recently the executive departments have shown a more candid concern regarding uranium imports where the Department of Labor has recently determined that uranium imports have contributed importantly to the decline in the sales and production of employment in the U.S. uranium industry, and after review of the facts and investigations, the Department says, and I quote, "We conclude that the increases of import of articles directly competitive with uranium contributed importantly to the decline in the sales of production and to the total or partial separation of the workers * * *" of those two firms, so here our Federal Government is saying that because of the imports, workers are entitled to worker's assistance, so Mr. Chairman, we believe that DOE has not carried out their responsibility under the DOE Act to provide for the maintenance of the domestic uranium industry, and instead they are trying to deny that the problem exists.

At the same time, the Department is busily pursuing the policies such as the distribution of uranium from the U.S. stockpile which serves to reduce the demand for uranium and further erode American jobs; 17,000 people are now unemployed in the U.S. uranium industry. Our domestic uranium industry is going down the tubes, and we are now or soon will be dependent upon the foreign sources for yet another of our energy needs, and as we represent also the workers in the oil industry, we recognize that whole scenario.

We cannot understand why our Government is failing to take the necessary actions to correct this situation. Mr. Chairman, we recognize and appreciate your great efforts on behalf of the uranium industry to preserve the jobs in the industry, and we only encourage you to continue those great efforts.

Thank you.

[The prepared statement of Mr. Hancock follows:]

TESTIMONY
ON BEHALF OF THE

OIL, CHEMICAL AND ATOMIC WORKERS
INTERNATIONAL UNION

BEFORE THE

ENERGY RESEARCH AND DEVELOPMENT SUBCOMMITTEE
OF THE SENATE ENERGY AND NATURAL RESOURCES COMMITTEE

CONCERNING THE SO-CALLED

"PRESIDENTIAL REPORT" ON THE STATUS OF THE
UNITED STATES URANIUM MINING AND MILLING INDUSTRY

WASHINGTON, D. C.
SEPTEMBER 12, 1984

Mr. Chairman and members of the Committee, my name is Nolan W. Hancock. I am the Citizenship-Legislative Director of the Oil, Chemical and Atomic Workers International Union. I appreciate this opportunity to testify on behalf of the OCAW concerning DOE's recent report entitled United States Uranium Mining and Milling Industry: A Comprehensive Review, issued in May of this year.

OCAW is the primary representative of workers employed in energy or fuel producing industries, with the exception of coal, with a total membership exceeding 120,000 members.

Our union represents approximately 10,000 workers in the nuclear industry, including groups employed in the production, extraction and mining of uranium or yellow cake.

Mr. Chairman, it does not take a lot of fancy statistics to understand the current condition of our domestic uranium industry. That condition is awful.

Over three-quarters of the uranium workforce -- some 17,000 men and women -- have been laid off. These include some several hundred of our members. Uranium production is heading for the basement. At last count, 17 mills were shut down or on standby, and the remaining 7 were operating at reduced capacity. We expect to see further cutbacks and even more layoffs.

More than 50% of the nation's uranium was produced in a 50-mile radius around Grants, New Mexico, in McKinley and Cibola Counties.

In 1979 at the peak of employment, 17 mines were operating in those two counties employing some 7,800 miners. In addition, there were many businesses that were support groups providing drilling equipment and supplies. Today only 2 companies remain in operation and production. There were many exploration companies in operation during this period, and now they are all gone.

The situation is catastrophic to many communities in New Mexico, Wyoming, Utah and Colorado. I brought a graph with me which clearly shows what is happening: production is nose-diving, so is employment.

Needless to say, the direct effect of the industry's decline has not only impacted severely on the employees and their families, but has in many incidences caused whole communities to go belly-up.

The potent combination of high unemployment and community deterioration ultimately and unfortunately leaves in its path terrible human toll, visible in increasing rates of alcoholism, suicides, and marital and family problems.

It is the opinion of OCAW that the magnitude of these consequences should not go unnoticed when selecting the criteria to be used in determining the viability of an industry and that they should in fact be given the highest priority.

The DOE's so-called "Presidential Report" pays some lip service to the uranium industry's current non-viable state but then conjures up the rosy forecast of a "steady growth" future. That forecast comes as a shock to us out here in the trenches.

Colorado Nuclear Corporation, which devised the computer model DOE used for its projection, has come up with the opposite result. I have a graph which, based on Colorado Nuclear numbers, plots the expected rise in imports against the expected decline in remaining demand to be filled by U.S. production. Under Colorado Nuclear's analysis, the only uranium production left in the U.S. will be an incident to phosphate production or as a result of a few solution mining projects. There just will not be a uranium industry and certainly not an industry capable of meeting our nation's needs. This is not the "steady growth" future propagated by DOE — this is a prognosis of "steady elimination."

Mr. Chairman, almost all new contracts for uranium are for uranium produced abroad. The reason is simple: foreign governments heavily support and subsidize their own uranium industries. They sell their surpluses here at prices below those in their home markets and they pour hundreds of millions of government cash into their own uranium development projects. Our uranium industry cannot survive in the face of that kind of "competition."

DOE tries to claim that the reason for the U.S. industry's death is not imports. DOE's position is indefensible. The data show that imports are now dominating our market. Colorado Nuclear indicates that this trend will contine.

Other Executive Departments are more candid concerning uranium imports. In July of this year, the Department of Labor twice expressly determined that uranium imports have "contributed importantly" to declines in sales, production and employment in the United States uranium industry.[1/] More specifically, in March of this year, workers at Atlas' Moab, Utah mill petitioned the Labor Department for worker adjustment assistance under Section 223 of the Trade Act of 1974.[2/] In response to that petition, the Labor Department found as follows:

[1/] See 49 Fed. Reg. 29880 (July 24, 1984) ("affirmative determination" as to Atlas); id 29881 (same as to Union Carbide).

[2/] 19 U.S.C. §2273.

> "Imports of uranium increased both absolutely and relative to domestic production in 1982 compared to 1981. The ratio of imports to domestic production more than tripled during this period. Data on 1983 imports are not yet available. However, preliminary estimates indicate that import levels in 1983 would be higher than those in 1982.
>
> The increased availability of imported uranium on the U.S. market for both long term contract and spot market delivery at prices below the average domestic cost of production was an important contributing factor to the decrease in production and employment at the Moab, Utah facility of Atlas Minerals in 1982 and 1983.
>
> After careful review of the facts obtained in the investigation, [we] conclude that increases of imports of articles like or directly competitive with uranium and vanadium produced at Atlas Minerals, Moab, Utah contributed importantly to the decline in sales or production and to the total or partial separation of workers of that firm."

The finding with respect to workers at Union Carbide's Dove Creek uranium mine was similar. Copies of these determinations are attached to my written statement. To compound the irony of all this, little or no money is available to supply the worker adjustment assistance.

Mr. Chairman, section 161(v) of the Atomic Energy Act requires DOE to take steps to assure the maintenance of a viable domestic uranium industry. DOE has done nothing to carry out this responsibility. Instead, it is trying to deny that a problem exists. At the same time, the Department is busily pursuing policies -- such as distribution of uranium from the U.S. stockpile

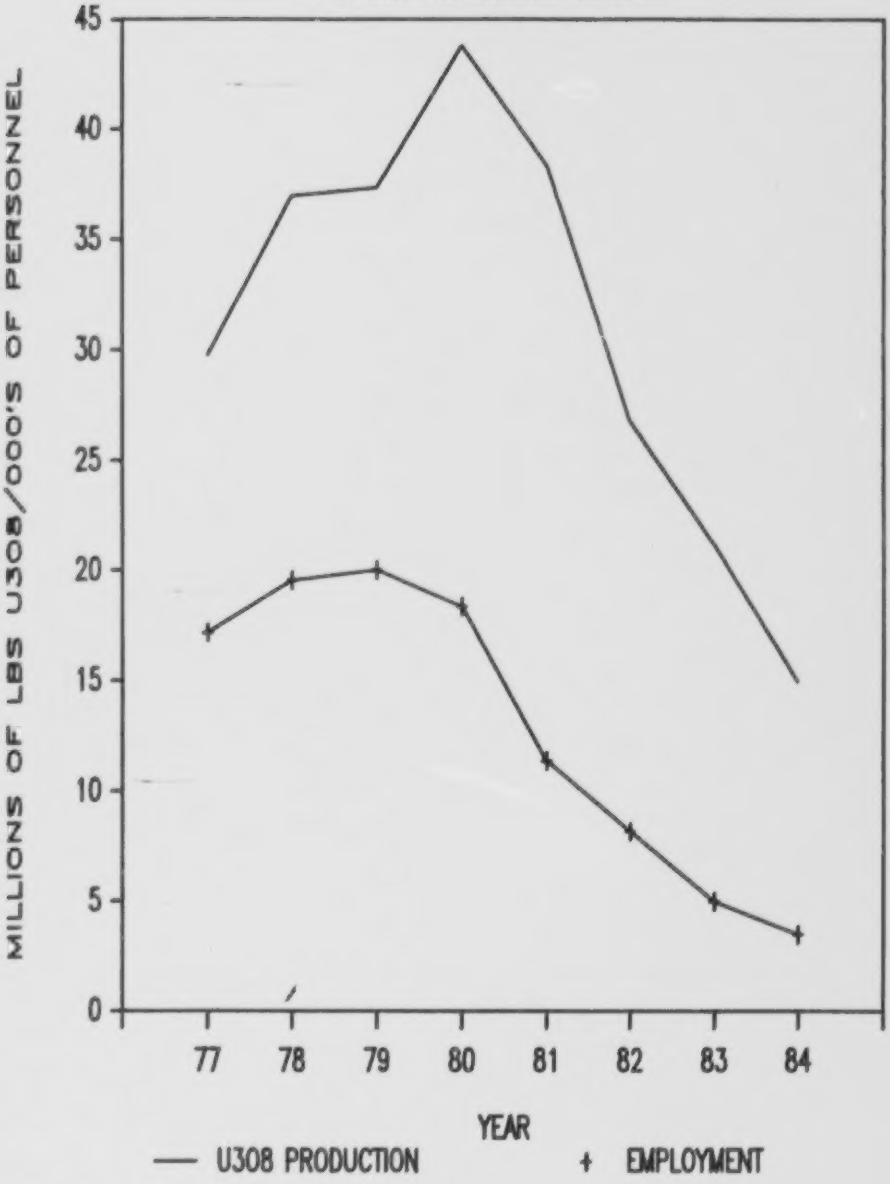
-- which serve to reduce demand for uranium and further erode American jobs.

17,000 people are now unemployed in the U.S. uranium industry. Our domestic uranium industry is going down the tubes. We are now or soon will be dependent on foreign sources for yet another of our energy needs. The OCAW cannot understand why the government is failing to take the necessary action to correct this situation.

Mr. Chairman, we recognize and appreciate your efforts to preserve our domestic uranium capacity and the jobs and energy independence which it represents. We encourage you to continue your efforts. Thank you for this opportunity to state our views.

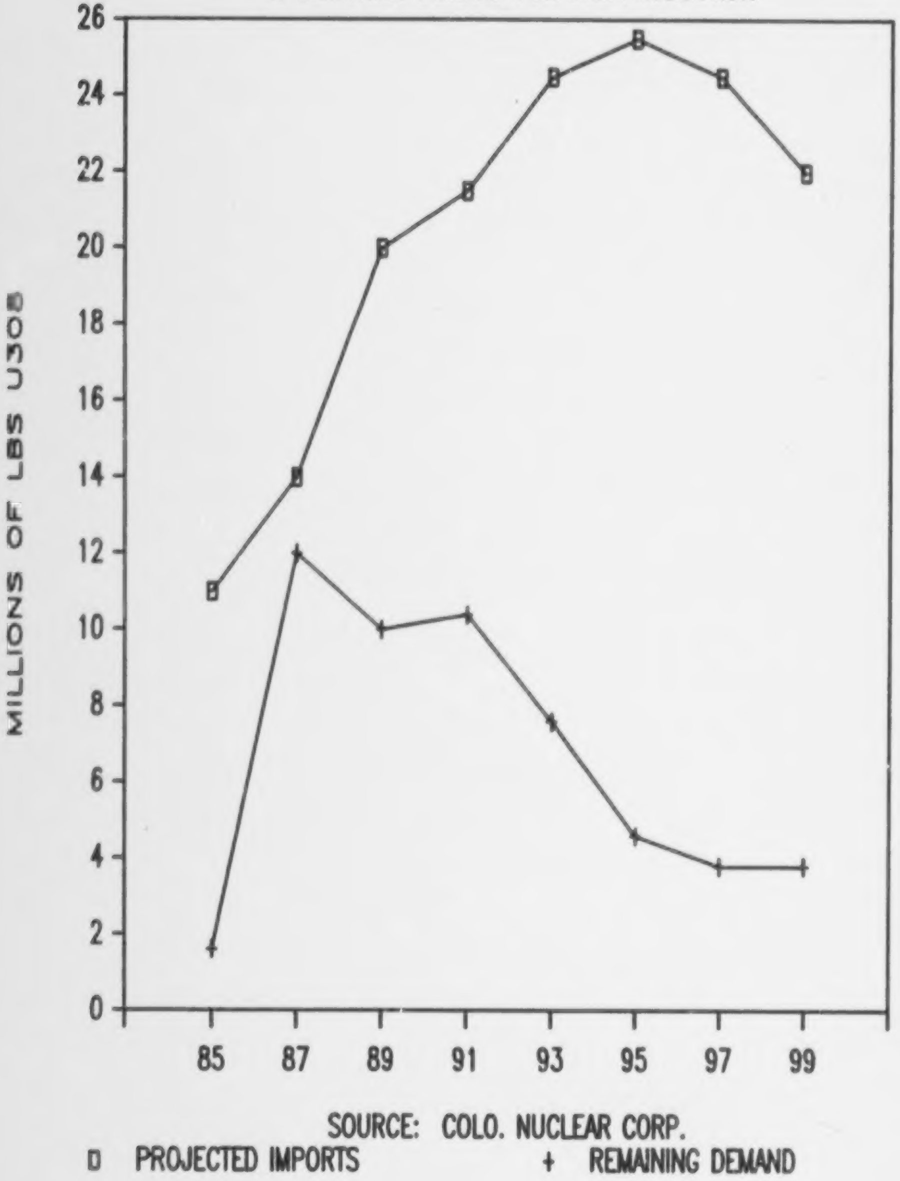
PRODUCTION AND EMPLOYMENT

IN THE U.S. URANIUM INDUSTRY



PROJECTED FOREIGN U308 IMPORTS

& REMAINING DEMAND FOR U.S. PRODUCTION



SOURCE: COLO. NUCLEAR CORP.

DEPARTMENT OF LABOR

Employment and Training Administration

TA-W-15,174

UNION CARBIDE CORPORATION
METALS DIVISION
DOVE CREEK, COLORADO

Certification Regarding Eligibility to Apply for Worker Adjustment Assistance

In accordance with Section 223 of the Trade Act of 1974 (19 USC 2273) the Department of Labor herein presents the results of an investigation regarding certification of eligibility to apply for worker adjustment assistance.

In order to make an affirmative determination and issue a certification of eligibility to apply for adjustment assistance, each of the group eligibility requirements of Section 222 of the Act must be met. It is determined in this case that all of the requirements have been met.

The investigation was initiated on January 16, 1984 in response to a petition received on January 4, 1984 which was filed on behalf of workers at Union Carbide Corporation, Metals Division Dove Creek, Colorado. The workers produce uranium.

Imports of uranium increased both absolutely and relative to domestic production in 1982 compared to 1981. The ratio of imports to domestic production more than tripled during this period. Data on 1983 imports are not yet available. However, preliminary estimates indicate that import levels in 1983 were comparable to those in 1982.

The increased availability of imported uranium on the U.S. market for both long term contract and spot market delivery at prices below the average domestic cost of production was an important contributing factor to the decrease in production and employment at the Dove Creek, Colorado facility of Union Carbide Corporation in 1982 and 1983.

Conclusion

After careful review of the facts obtained in the investigation, I conclude that increases of imports of articles like or directly competitive with uranium produced at Union Carbide Corporation, Metals Division, Dove Creek, Colorado contributed importantly to the decline in sales or production and to the total or partial separation of workers of that firm. In accordance with the provisions of the Act, I make the following certification:

> "All workers of Union Carbide Corporation, Metals Division, Dove Creek, Colorado who became totally or partially separated from employment on or after December 28, 1982 are eligible to apply for adjustment assistance under Section 223 of the Trade Act of 1974."

Signed at Washington, D.C. this 12th day of July 1984.

CERTIFYING OFFICER
ROBERT O. DESLONGCHAMPS
Director, Office of Legislation
and Actuarial Services, UIS

DEPARTMENT OF LABOR

Employment and Training Administration

TA-W-15,239

ATLAS MINERALS
MOAB, UTAH

Certification Regarding Eligibility
to Apply for Worker Adjustment Assistance

In accordance with Section 223 of the Trade Act of 1974 (19 USC 2273) the Department of Labor herein presents the results of an investigation regarding certification of eligibility to apply for worker adjustment assistance.

In order to make an affirmative determination and issue a certification of eligibility to apply for adjustment assistance, each of the group eligibility requirements of Section 222 of the Act must be met. It is determined in this case that all of the requirements have been met.

The investigation was initiated on March 12, 1984 in response to a petition received on March 5, 1984 which was filed on behalf of workers at Atlas Minerals, Moab, Utah. The workers produce uranium oxide and vanadium pentoxide.

Imports of uranium increased both absolutely and relative to domestic production in 1982 compared to 1981. The ratio of imports to domestic production more than tripled during this period. Data on 1983 imports are not yet available. However, preliminary estimates indicate that import levels in 1983 would be higher than those in 1982.

The increased availability of imported uranium on the U.S. market for both long term contract and spot market delivery at prices below the average domestic cost of production was an important contributing factor to the decrease in production and employment at the Moab, Utah facility of Atlas Minerals in 1982 and 1983.

Conclusion

After careful review of the facts obtained in the investigation, I conclude that increases of imports of articles like or directly competitive with uranium and vanadium produced at Atlas Minerals, Moab, Utah contributed importantly to the decline in sales or production and to the total or partial separation of workers of that firm. In accordance with the provisions of the Act, I make the following certification:

> "All workers of Atlas Minerals, Moab, Utah who became totally or partially separated from employment on or after February 28, 1983 are eligible to apply for adjustment assistance under Section 223 of the Trade Act of 1974.

Signed at Washington, D.C. this 12th day of July 1984.

CERTIFYING OFFICER
STEPHEN A. WANDNER
Deputy Director, Office of
Legislation and Actuarial Services, UIS

Senator Domenici. Thank you very much.

Mr. Ritchie.

STATEMENT OF IAN RITCHIE, PRESIDENT AND CHIEF EXECUTIVE OFFICER, PATHFINDER MINES CORP., SAN FRANCISCO, CA

Mr. Ritchie. Mr. Chairman, my name is Ian Ritchie. I am the president of Pathfinder Corp. I have been involved in the uranium mining and milling industry for over 25 years.

Pathfinder owns and operates three uranium mines and mills, all in the State of Wyoming. Additionally we engage in domestic exploration and worldwide uranium marketing efforts.

Pathfinder and its corporate predecessors have been engaged in the business since approximately 1957; 80 percent of our stock is owned beneficially by a French corporation commonly known as Cogema. The remaining 20 percent is owned by General Electric Holdings, Inc., which is a wholly owned subsidiary of General Electric Co.

Pathfinder makes its commercial decisions based solely on traditional business considerations and intends to remain as a viable domestic producer of uranium on a long-term basis.

Rather than presenting a direct critique of DOE's report and hence merely repeat what many others have said, I wish to present our views of the domestic mining and milling industry.

We agree with the basic conclusion in the DOE report that the industry is currently depressed and in the near term no particular improvement can be foreseen. In fact, our 1985 domestic production likely will be about 11 to 12 million pounds uranium-308, which is about 25 percent of the peak years.

Our opinion as to what has caused this is as follows: There was a rapid decline in demand for uranium without an offsetting decline in supply. Demand fell for the following reasons—decrease in the demand for electricity, increased nuclear plant construction costs, regulatory uncertainties, delays in licensing, and adverse public opinion.

Some of the reasons for the increase in supply were prevailing and predicted. Uranium price levels in the late 1970's attracted many new companies into the domestic industry. Large low-cost deposits were discovered and developed in Australia and Canada, and more recently utilities have commenced selling excess uranium inventories.

There are some steps we believe might be taken in order to improve the viability of our industry. Government must act in a manner conducive to the growth of nuclear power in the United States such as streamlining procedures for licensing of new plants and removing regulatory uncertainties.

Public utility commissions must adopt a more realistic ratemaking posture so as to allow utilities to more rapidly recover their construction costs.

Overregulation of domestic mining and milling industry should be removed. The domestic industry must make every effort to be as efficient and cost competitive as possible.

We must also endeavor to keep the public informed of the true merits of nuclear power.

I wish to emphasize, Mr. Chairman, that the uranium industry is international in scope. For example, as I mentioned earlier, Pathfinder has several long-term Far Eastern customers. Any steps taken should be designed toward making the industry more competitive with foreign suppliers in both domestic and international markets. Measures designed not only to protect domestic industry such as tariffs and embargos could be counterproductive and influence retaliation.

There is no assurance such measures would have the desired effect. Such measures do not address the problems on the demand side at all.

We undoubtedly face stiff competition from foreign producers. Foreign producers have lower cost, higher grade reserves. Exchange rates currently operate in their favor today.

We do have some advantages here in this country, however, such as more stable infrastructure and a better reputation for reliability of supply.

Finally, we believe adoption of a more realistic Federal policy concerning the export of uranium, streamlining uranium export licensing processes, opening of additional Federal controlled lands to exploration and mining, and perhaps providing tax incentives to domestic producers could assist in maintaining a viable domestic industry.

Thank you, Mr. Chairman, for this opportunity to appear today.

[The prepared statement of Mr. Ritchie follows:]

TESTIMONY OF IAN RITCHIE

Senate Energy and Development Subcommittee
Hearing on Department of Energy Report Entitled
"United States Uranium Mining and Milling Industry:
A Comprehensive Review" (May 1984)
September 12, 1984

Mr. Chairman, my name is Ian Ritchie. I am the President and Chief Executive Officer of Pathfinder Mines Corporation. I have been involved in the uranium mining and milling industry for over 25 years. Pathfinder owns and operates three uranium mines and two uranium mills, all of which are located in Wyoming. Additionally, we engage in domestic exploration and worldwide uranium marketing efforts. Pathfinder and its corporate predecessors have been engaged in the uranium business since approximately 1957. 80% of our stock is owned beneficially by a French corporation, commonly known as Cogema. The remaining 20% is owned by General Electric Holdings, Inc., which is a wholly owned subsidiary of General Electric Company. Pathfinder makes it commercial decisions based solely on traditional business considerations and intends to remain as a viable domestic producer of uranium on a long-term basis.

Rather than directly critique the Department of Energy's recent report on the domestic uranium mining and milling industry, I would like to present today for comparison my opinion as to the present status of the domestic industry, the causes of the present situation and possible steps for improvement.

There is no question that, as indicated in the DOE's report, the domestic uranium mining and milling industry is depressed. Since 1979, the spot market price for uranium concentrate has fallen, in terms of 1984 dollars, from approximately $70 per pound to a low of around $17. The numerous layoffs and mine closures which have occurred are well known and documented in the DOE's report. Industrywide, employment has fallen in the last five years from over 15,000 to under 4,000. In Wyoming, the employement level has dropped from a peak of approximately 5,500 in 1980 to less than 1,100 presently.

In any consideration of the viability of the domestic industry, it seems to me that an important first step is to understand what has caused the problems. There are a number of factors which, in my opinion, have converged to create the current situation. Basically, however, and simply stated, the present situation is the result of a rapid decline in demand without an offsetting decline in supply.

Demand has fallen because many utilities have cancelled or significantly delayed plans to construct new nuclear power plants. The reasons for such cancellations are numerous and include a decrease in predicted demand for electricity, increased plant construction costs, uncertainties created by excessive governmental regulation of nuclear power plants, numerous delays in the licensing process and adverse public opinion, which was accentuated by the Three Mile Island incident.

All these factors seemed to take effect at nearly the same time and the result was a very abrupt, generally unforeseen, decline in demand. The effect of the decline was magnified because it came at a time when the domestic uranium industry was rapidly expanding. This was primarily because prevailing and predicted uranium price levels during the mid and late 70's attracted many new companies into the domestic industry. Exploration efforts were intensified, new mills were constructed and mines opened. Very large low cost deposits were also discovered and developed during this time in Australia and Canada.

Further contributing to the decline was the sale by utilities of excess uranium supplies. Because prices were rising and supply was limited during the mid and late 1970's, many utilities increased inventories and made large contractual commitments for future uranium. When those utilities cancelled or delayed plans to construct new nuclear power plants, or needed cash but did not wish to borrow during periods of high interest rates, some began selling their uranium inventories, thus further increasing the available supply at the same time that demand was rapidly falling.

Governmental action has also contributed to the current state of the domestic industry. First, as noted previously, the burgeoning, and increasingly tenacious, morass of governmental regulations applicable to nuclear power plants has deterred many utilities from undertaking new nuclear projects. The increasing delays and uncertainties involved in obtaining necessary construction and operating permits, with the accompanying cost increases, has made many utilities unwilling to undertake the risks involved.

Governmental uranium enrichment contracting policies have also been a factor. As many here today are aware, uranium concentrate must be enriched before it can be utilized as fuel in a nuclear power plant. Domestically, only the federal government performs such enrichment work. During the mid 1970's utilities were required to sign a 10-year fixed commitment contract for enrichment services. As its name implies, that contract required utilities to fix the amount of enrichment work to be performed during a 10-year period. Faced with such a contract, utilities attempted to buy enough uranium to cover their 10-year enrichment requirement. This increased demand and prices and contributed to a rapid supply increase.

Additionally, governmental regulations during that time period limited the amount of foreign uranium which could be enriched in the United States. This caused nearly all utilities to seek domestic uranium and made the over-supply worse.

In short, the present state of the industry is largely the result of an imbalance of supply and demand, which stems from a convergence of all the factors I have just described.

Having reviewed what I believe are the causes for why we are where we are, I believe it now appropriate to discuss the actions which I believe federal and state governments, as well as the uranium industry, might undertake in an effort to improve conditions and maintain a viable domestic industry.

Looking first at the demand side, federal and state governments must act to create an environment conducive to the growth of nuclear power in the United States. One important step in this direction would be to streamline the procedures for licensing new plants in order to mitigate delays and remove the uncertainties utilities now face in the licensing process. At present, both a construction license and an operating license must be obtained. Combining this two-tier licensing process into one could eliminate considerable delay. Overly stringent and unnecessary regulations must be eliminated. Additionally, the federal government must also move ahead vigorously and promptly with its nuclear waste disposal program and states must cooperate in that effort.

State public utility commissions should adopt a more realistic view in rate-making matters and allow utilities to include in their rate base construction costs for plants as they accrue rather than forcing the utility to await commencement of operation of a plant. Also, nuclear plant siting decisions must be expedited.

Turning to the supply side, federal and state governments can eliminate what I perceive to be a considerable amount of over regulation on the domestic mining and milling industry. For instance, the federal Environmental Protection Administration recently promulgated what I consider to be irrational standards for the reclamation of uranium mill tailings sites. Despite a lack of scientific evidence indicating that radiation from tailings presents any significant health hazards, the standards insisted upon by EPA would, in effect, require that tailings be covered by approximately 10 feet of soil and rock. The cost of complying with such a standard is enormous, while the benefits appear to be minimal or nonexistent.

Another example is the presently pending legislation which would add uranium oxide to the list of substances which are subject to taxation under the Superfund program. Active domestic uranium producers are already required to maintain in place extensive financial security to assure that tailings and other waste products are disposed of properly. Funding for the clean-up of older, inactive sites, most of which operated solely to produce uranium for the federal government, is already provided for under Title I of the 1978 Uranium Mill Tailings Control Act. Inclusion of uranium oxide in the Superfund program would be needless over-kill, particularly when there has never been a finding that uranium oxide production waste products are hazardous.

A fundamental problem underlying much of what we perceive as regulatory abuse is that it is simply too easy to propose and adopt new regulations. The burden is on industry to establish that the regulations are not needed. We believe the burden should be shifted to the administrative agency. That agency should be required to produce significant evidence that the proposed regulations are necessary and economically justified.

Taxation of producers must also be kept within reason. New Mexico has moved in this direction by decreasing its severance tax on uranium.

The domestic industry must also help by making every effort to be as efficient and cost competitive as possible. We must endeavor to inform the public of the truth concerning nuclear power and the uranium mining industry. As an example, recently industry was instrumental in forming a group known as the Committee for Energy Awareness. That Committee has undertaken a major program aimed at bringing accurate information to the public concerning nuclear power and other energy sources.

As a last point today, I would like to emphasize that the uranium industry is international in scope. If present projections are accurate, the demand for uranium by overseas utilities will become an increasingly important market factor in coming years. For instance, Pathfinder presently has long-term supply contracts with several Far Eastern customers. In view of the increasing importance of the international market, we believe that any steps taken to improve conditions within our industry should be aimed at making the industry competitive with foreign uranium suppliers in both domestic and international markets. Measures designed only to protect the domestic industry from foreign competition within the U.S., such as tariffs or embargoes on foreign uranium, could prove to be counterproductive. Foreign utilities might be influenced to refrain from purchasing U.S. uranium. Moreover, there is no assurance that such measures would have the desired affect. The result might be to induce new producers to enter the market and increase domestic production to the point where a gross over supply would exist and prices would decrease. Such measures do not address the problems on the demand side at all. In fact, excessively high prices for domestic uranium would increase the cost of operating nuclear plants and cause those plants to be less competitive with other forms of electric generation.

Domestic producers unquestionably face stiff competition from foreign producers. It is a fact that foreign reserves are of generally higher quality than U.S. reserves and production costs are lower in many cases. The increasing strength of the U.S. dollar also provides a significant advantage to foreign producers. U.S. producers do, however, have some advantages over foreign competitors and can be competitive. As an example, Pathfinder is presently in the final stages of negotiating another long-term arrangement with a domestic utility. Domestic producers have a better infrastructure to support their mining operations and tend to have a better reputation for reliability of supply. Efforts to improve the domestic industry's condition might best be expended by concentrating on ways of enhancing such advantages, such as by adopting more realistic federal policies concerning the export of domestic uranium and streamling the export licensing process. Opening additional federally controlled lands to exploration and mining would also help.

Thank you very much for the opportunity to appear today.

Senator DOMENICI. Thank you very much. Do you have any source of supply that is outside of the United States? Do you mine or mill outside of the United States?

Mr. RITCHIE. No; we do not.

Senator DOMENICI. Strictly American?

Mr. RITCHIE. Yes, sir.

Senator DOMENICI. I had questions, maybe one for each, but I think what I will do is in light of the time, I will try to consolidate them and have the staff forward them to you for your responses and get them back kind of quick to make them part of the record.

Unless Jeff has some additional questions, we will adjourn here in a moment.

Senator BINGAMAN. I have no questions, Mr. Chairman. Thank you for allowing me to participate. I appreciate it.

Senator DOMENICI. I am most appreciative of your being here and of your efforts and assistance.

I think you all know I am genuinely concerned. This hearing indicates the history of involvement. I want to thank all of you for today and for what you have been doing. I come out of this 2 hours more convinced than ever that DOE and the assessment group that Erich runs are wrong. I think we are in desperate shape.

I think they are about to give us wrong information again, and in addition, I think maybe their actions with reference to selling off uranium and the way they are approaching enrichment process and making sure that it is paid for I think added all up, some of their actions even on the affirmative side are calculated to do even more harm, and I can only say that I am going to do what I can in the remaining time this particular year, and if I am fortunate to come back will continue at it.

I think we have to save the industry, and I tend to agree with you, Mr. Stevens. I just can't believe that the definition of viability is forthcoming from all the work we did on that law. It just doesn't seem to me to be anything like what any ordinary person would call viability in terms of how they define it.

I think the charts were dramatic; using the same kind of information, have a rather reputable private sector company come up with almost opposites with reference to all of it, is to me very, very discouraging. I can't quite find out why all this is happening, but maybe it is a bias on the part of those in the administration at this point. I don't know, but clearly I don't have a great deal of confidence in what they are concluding. From what I hear, you don't either.

It seems to me none of you think they are approaching it right, including correctly, or evaluating the information appropriately, and probably not even using necessarily the right characteristics to determine that viability, but with that, we will get you some questions. Answer them as soon as you can, and we thank you very much for your help and your attendance.

The subcommittee is adjourned.

[Whereupon, at 4:08 p.m., the hearing was adjourned.]

APPENDIXES

APPENDIX I

Responses to Additional Questions

Department of Energy
Washington, D.C. 20585

September 27, 1984

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
  Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D.C. 20510

Dear Mr. Chairman:

On September 12, 1984, Danny Boggs, J. Eric Evered, and R. Gene Clark, appeared before your Subcommittee to discuss the Department of Energy's/Energy Information Administration's comprehensive review of the status of the domestic uranium mining and milling industry.

Following that hearing, you submitted written questions for response to supplement the record and additional questions for our response. Enclosed are answers to both sets of questions.

If you have any questions, please call Hank Edler or Tom Pretorius of my staff on 252-4277. They will be happy to assist you.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosures

Senator Domenici (First Set)

Q1: What power generation projections will the viability report use as a basis for analysis?

A: The Secretary's first annual assessment on the viability of the domestic uranium mining and milling industry will consider two different demand scenarios. The nuclear generation capacity projections associated with the first of these scenarios will be based on 1983 year-end information as presented in the EIA's Annual Energy Outlook 1983. The second scenario will consider a lower demand case, consistent with the low case generation projections presented in EIA's forthcoming annual publication of "World Commercial Nuclear Power."

	Domestic Net Design Nuclear Power Capacity (GWe)	
YEAR-END	1st CASE	2nd CASE
1984	73.6	68.9
1985	84.8	81.3
1986	94.3	87.3
1987	104.3	97.5
1988	104.8	104.3
1989	107.1	105.5
1990	110.8	106.6
1991	113.2	107.8
1992	116.9	107.8
1993	119.2	109.1
1994	119.2	109.1
1995	119.2	109.1
1996	121.6	109.1
1997	122.9	109.1
1998	122.8	108.9
1999	122.8	108.9
2000	122.7	108.9

Senator Domenici (First Set)

Q2: Price projections in the REPORT indicate a low projected price of $17.80 for 1984. Why is that? The spot price has dipped below that during 1984. How valid are these projections?

A: The Energy Information Administration (EIA) recently conducted its mid-year uranium marketing survey, Form EIA-491-B, covering uranium sales and purchases made during the first six months of 1984. The results of the survey show that the average price (including spot prices, long-term contract prices, and the floor price of long-term contracts) of new contracts signed in the first half of 1984 was $18.54, before future escalation factors. The prices in the President's Report are in constant 1983 dollars; thus, the $17.80 estimate you reference in your question should be increased to about $18.50 to reflect constant 1984 dollar value. The average price for new contracts signed in the first half of 1984 is, therefore, at the low end of the projected price range in the President's Report. Of course, the final year 1984 average price will depend on transactions during the second half of 1984, as well.

Projections of future economic activity, as produced by the EIA, are necessarily based on simplified representations of market behavior and estimated data on such characteristics as production costs and productivity. To the extent that these simplified representations accurately reflect market behavior, the projections are as good as the estimated data input to the system. The price projections in the President's Report are shown as ranges, which reflect our uncertainty about the input assumptions.

Senator Domenici (First Set)

Q.3:Is DOE considering marginal pricing?

A: If DOE is to remain a competitive supplier of enriched uranium, we must be responsive to the market that we serve. With the introduction of the Utility Services (US) contract, we have attempted to strengthen our marketing and customer servicing. We are fully committed to servicing the customer well, both now and after his conversion to the US contract. Listening to what the customer wants and needs is the best way of our remaining in touch with the market and staying competitive.

However, it is obvious that after the conversion to the new contract, a significant amount of customer business remains uncommitted to any supplier. This category of customers includes those who have signed with DOE for only 70 percent of their requirements as well as those who have not converted to the US contract and are buying from the secondary market or other sources. To compete effectively for this market, DOE plans to maintain attractive prices and flexible contract terms.

One of the concepts which may help assure DOE's competitiveness is offering incentive pricing to all of our customers. This incentive pricing, commonly referred to as "marginal pricing" in the trade press, involves DOE having a price structure that allows us to compete with other suppliers for this uncommitted market share. The concept currently being evaluated is to provide a single base price for all the customer's product he takes up to a fixed percentage of his needs, and a lower incentive price for any amount of product delivered over that minimum amount. Such a pricing structure would not be offered until 1987 in order that surplus U.S.-origin separative work in the hands of our customers can be utilized. We are currently evaluating several plans and requesting feedback from our customers. We intend to report our findings to Congress in concert with testimony on the fiscal year 1986 budget. To the extent that these marketing concepts result in increased sales of our enrichment services, domestic uranium producers could also realize increased sales of natural uranium.

Senator Domenici (First Set)

Q.4: How much revenue will DOE generate by variable tails assay surcharge?

A: The Variable Tails Assay Option will not be offered under the Utility Services contract until 1987. This option will be priced based on the variable cost of service associated with providing different separative work quantities in accordance with full cost recovery principles. The amount of revenues will vary with the tails assay our customers select. Our estimates are based on 0.235 percent U-235 tails assay being selected on the average by our enrichment service customers. The higher the tails assay above 0.235 percent the greater will be the revenues. Conversely, the lower the tails assay the lower the revenues. Assuming that our customers on average select a 0.235 percent tails assay, DOE could generate about $30 million per year in the late 1980's which could increase to about $60 million per year in the 1990's. With the total enrichment revenues in excess of $2 billion, these additional revenues to cover variable production costs are not large by comparison.

Q.5: To what extent, if any, are DOE enrichment and uranium policies coordinated?

A: The economic fortunes of the domestic uranium mining and milling industry and the U.S. enrichment enterprise are necessarily interrelated. Our activities in uranium enrichment have been directed toward stabilizing our uranium enrichment market and continuing a vigorous enrichment business. By achieving these goals, we will be enhancing the viability of the domestic uranium mining industry by providing a stable, dependable domestic market for the industry's product.

Our policy with respect to the uranium mining and milling industry is to closely monitor its viability and to keep the mining and milling industry appraised of our enrichment policies. The manager of our uranium enrichment enterprise stays fully aware of the results of this monitoring and maintains communication with the mining and milling industry through the American Mining Congress.

Obviously, situations will arise where there will be potential conflicts in the policies relating to these closely associated activities. When these situations arise, the potential impacts on both sectors are taken into consideration in making our choices.

Senator Domenici (First Set)

Q6: Does the analysis of a uranium embargo assume that Canada will continue to supply its other foreign contracts? What price would Canadian uranium sell for under your scenario?

A: The President's Report contains a section titled National Security Emergency (pages 64-65) which is premised on a condition of national industrial mobilization. In studies of hypothetical national security emergencies requiring such a mobilization, the technical ability to supply our needs is considered paramount. Accordingly, we have not estimated the expected price of uranium under such a hypothetical condition.

Although we made no specific assumption about whether Canada would supply its other foreign contracts, Table 21 on page 65 of the President's Report indicates that production capability for the U.S. plus Canada is projected to exceed our joint requirements by 24, 21, 32, and 12 million pounds of U_3O_8 for the years 1985, 1990, 1995, and 2000 respectively. These quantities would be available for export.

Further information on this topic has been provided in response to your hearing follow-up question on the decision to include Canadian production along with U.S. production.

Q7: Attached is a critique of the President's study by Colorado Nuclear Corporation. Please respond to their criticisms.

A: We are currently reviewing the Colorado Nuclear Corporation (CNC) report and anticipate that a thorough comparison and critical evaluation of the differences between the two reports will require several weeks and will necessarily include discussions with CNC staff. The results of our review will be provided to the Committee as soon as possible.

Senator Ford - Questions 1 and 2

Q: Many of the statements at this hearing seem to assume that commercial demand for uranium is going to pick up (these are the words in the Boggs statement, p. 3).

How do we know this demand is going to pick up?

A: The international nuclear industry currently has large inventories of uranium, which we estimate will be used over the next few years to satisfy the immediate needs of the electric utility industries. Thus, in the near-term, we see a drop in domestic production. Once inventories reach desired levels (1 to 2 years of forward coverage for domestic utilities), however, the needs of existing plants and the continued addition of new nuclear power plants on an international basis will provide a moderately growing demand for new uranium production. We estimate that domestic production could range from a low of 7,000 to 10,000 short tons in 1985 to between 10,000 and 15,000 short tons in the 1990's.

Even though there have been no new orders for nuclear plants since 1978 and there have been many cancellations, there are still approximately 40 electrical gigawatts (GWe) of capacity in the construction pipeline that could become operational by the year 2000. The growth in foreign nuclear reactor capacity is expected to be more extensive with the possibility of 100 to 150 GWe of new capacity being added by the year 2000. In addition, the refueling of existing reactors will continue to contribute to demand.

The growth in reactor capacity leads directly to increased requirements for new uranium production. Most of the projected future domestic requirements for uranium and much of the projected future foreign requirements are not currently under contract. Our estimate, based on information covering the size and extraction costs of worldwide uranium deposits and production centers, is that domestic uranium production will increase moderately to meet the growing demand from domestic reactors. There is, of course, a good deal of uncertainty in the projections of future uranium requirements and in the relative costs of the different supply sources, particularly in foreign countries, but our analysis of this uncertainty leads to the conclusion that there could be modest growth in domestic uranium production in the 1990's.

Senator Ford - Question 3

Q: What are we assuming about the growth of the nuclear power industry? 150 plants in the year 2000? 120?

A: The nuclear capacity projections presented in the President's Report are based on the status of the nuclear power industry as of year-end 1982. At that time, there were 73 units, totaling about 57 GWe, in commercial operation and 71 units, totaling about 78 GWe, in the construction pipeline. Further, 11 reactors, totaling about 5 GWe were assumed to be retired by the year 2000. Because these projections assumed no cancellations, the sum of the units in operation and in the construction pipeline minus the units assumed to be retired yielded the year 2000 projection of 133 reactors, totaling 130 GWe.

These projections have been revised downward since the time the analysis in the President's Report was finalized (13 nuclear reactors have been cancelled since the end of 1982 and 9 are currently in indefinite status). The upcoming assessment on the viability of the domestic uranium industry by the Secretary of Energy will examine two demand scenarios, with nuclear power capacity projections in the year 2000 amounting to approximately 123 GWe in the first case and 109 GWe in the second demand scenario.

Senator Ford - Question 4

Q: How sensitive is the optimism about a turn around in uranium demand to assumptions about new nuclear powerplant construction?

A: Estimates of future demand for domestic uranium are somewhat sensitive to assumptions about new nuclear powerplant construction. Most of our analysis of the effect of changes in powerplant construction assumptions results in modest changes in the demand for domestic uranium.

There are several other factors that can have significant effects on the demand for domestic uranium. For example, assumptions concerning reactor performance (i.e. capacity factors), enrichment tails assays, and burnup levels of nuclear fuel can, separately or together, significantly affect the forecasted values of uranium demand. These effects can be greater, in aggregate, than the uncertainty in projected nuclear power capacity.

Senator Ford - Question 5

Q. Are we planning to sell uranium overseas? Isn't that sort of impossible without some kind of subsidy?

A. The President's Report does not analyze the question of how much uranium U.S. producers may export in the future. Given recent history and current export contracts, however, it is not obvious that some level of exports will not continue in the future without a subsidy.

As of the end of 1983, domestic uranium producers had contract commitments to export approximately 4.8 million pounds (2,400 short tons) of uranium in 1984 and beyond at an average base contract price of about $40.00 per pound of U_3O_8. In 1983, 3.3 million pounds of uranium were exported from the United States at an average delivered price of $33.35, compared with 1982 exports of 3.2 million pounds at $29.10 per pound. These exports represented approximately 16 percent of U.S. uranium production in 1983 and 12 percent of 1982 production. The U.S. Government does not subsidize uranium exports.

Senator Ford - Question 6

Q: What will be the impact of the new supplies from Australia on the world market? On the domestic market?

A: Australia is not a dominant source of uranium supply to the United States. As of the end of 1983, import commitments for delivery of Australian uranium in 1984 and beyond amounted to about 5 percent of total import commitments and less than one percent of total projected U.S. demand through the end of this century. The analysis presented in the President's Report assumes deferred development of major Australian uranium reserves, which is the policy of the current government of Australia. The impact of a change in the current Australian policy with respect to these reserves is difficult to quantify but, given the current Australian floor price policy, these reserves would not be expected to be competitive in the world market for quite some time.

Senator Ford - Question 7

Q: This Administration has been quite vocal in its support of nuclear energy. What is your policy for nuclear fuel supply, which, at least for enrichment, is a Federal monopoly?

A: For uranium enrichment, we are committed to remain a highly reliable supplier of enrichment services. We are structuring our enrichment enterprise as an effective business organization, and toward that end, we intend to maximize private sector participation in our operation with the ultimate goal of full privatization.

Senator Ford - Question 8

Q: How do you coordinate your enrichment and mining policies?

A: The economic fortunes of the domestic uranium mining and milling industry and the U.S. enrichment enterprise are necessarily interrelated. Our activities in uranium enrichment have been directed toward stabilizing our uranium enrichment market and continuing a vigorous enrichment business. By achieving these goals, we will be enhancing the viability of the domestic uranium mining industry by providing a stable, dependable domestic market for the industry's product.

Our policy with respect to the uranium mining and milling industry is to closely monitor its viability and to keep the mining and milling industry appraised of our enrichment policies. The manager of our uranium enrichment enterprise stays fully aware of the results of this monitoring and maintains communication with the mining and milling industry through the American Mining Congress.

Obviously, situations will arise where there will be potential conflicts in the policies relating to these closely associated activities. When these situations arise, the potential impacts on both sectors are taken into consideration in making our choices.

Senator Ford - Question 9

Q: Because you are the enrichment vendor, you are pretty active against foreign competition in enrichment. What about foreign competition in mining?

A: We believe it is necessary for DOE, as the supplier of enriched uranium, and the private domestic mining industry to undertake business decisions which will keep our products competitive with foreign supplies. At the same time, we are against unfair competition whether it involves subsidies, pricing, or dumping activities. Should it become evident that foreign producers are using unfair practices, we would recommend appropriate action.

Senator Domenici Question 1 (Second Set)

Q: In your testimony, you stated, as the Department has stated for sometime, that the major factor influencing the domestic uranium industry is a decrease in demand for uranium because of nuclear power plant cancellations. Given that fact, I wish you had taken the proper demand figures into account in your model. But beyond that, I do not see, given the answer I received during the hearing, that you can say with any certainty that it is solely demand that will affect domestic production in the future rather than levels of uranium imports or price generally. It is just sloppy analysis as I see it. We can say with some certainty that imports are not the substantial cause of why the industry is where it is today, but we cannot continue to hide from the fact that they will be the principal problem of the future. Would you please provide comments on that for the Record?

A: First, let me emphasize that the demand figures presented in the President's Report were based on 1982 year-end information which was the most current information available at the time of the analysis. The decrease in demand for uranium due to nuclear power plant cancellations is one of many factors influencing the domestic uranium industry. Although demand is a major factor affecting our projections of future domestic production, it is not the sole consideration. As you suggest, price and import penetration are also important factors. Likewise, the current situation of high levels of utility inventories of uranium must be considered.

The President's Report presents information on the historical and projected levels of each of these factors. Figure 12 on page 53 of the report illustrates the relative shares of utility market requirements projected to be supplied by domestic uranium, imports and inventory draw down.

The report reaches no conclusion on the current or projected future viability of the industry. The Secretary of Energy will release his first annual assessment of industry viability (including an analysis of the domestic industry's import commitment dependency) later this year.

Senator Domenici - Question 2 (Second Set)

Q: In 1981 the Assistant Secretary for the Department of Energy testified before this Subcommittee that the Department would not pursue policies which would result in the draw down of the domestic stockpile. Your new uranium enrichment policies are in contradiction to that. Exercising the split tails option will decrease demand by about 50 million pounds over the next 4 years. Your modified version of the enrichment contract, which you failed to even send to this Congress as required under the law, puts a surcharge on the variable tails assay which will decrease demand by 38 million pounds. Can you explain why the Department feels the need to balance its enrichment books on the back of the domestic uranium industry?

A: This question is answered as an insert at line 10 of page 35 of the transcript.

Senator Domenici Question 3 (Second Set)

Q: The Department has continued to deny any relationship between the perception that imports are going to take a greater share of our market and the continued decline of our industry. I find this very surprising in that the Department of Labor, in just the past few months, has twice expressly determined that uranium imports have "contributed importantly" to declines in sales, production and employment in the United States industry. Would you please comment for the Record?

A: The impact of imports on the domestic uranium market is recognized in the President's Report. The data and projections in the report, as summarized in Figure 12 on page 53, support the expectation that, under current policy, there would be no net increases in deliveries from new contracts for domestic-origin uranium through 1988 but a doubling of deliveries of foreign-origin uranium during the same period.

The current situation of low demand and ample supply depresses the market price for uranium, which is below the cost of some domestic production. Thus, lower cost foreign supplies have an advantage in the current market.

Currently, lower than anticipated demand, low market prices, low cost foreign supply sources, and high levels of uranium inventories held by U.S. utilities all combine to impact negatively on domestic sales, domestic production, and employment in the domestic uranium industry. However, Figure 12 also illustrates that, as demand is projected to increase in the 1990's and as inventories are drawn down to desired levels, domestic production is expected to reclaim an increasing share of the market.

Senator Domenici Question 4 (Second Set)

Q: Obviously, you must believe there are circumstances wherein the Federal Government should take actions to assure that practices such as dumping and unfair subsidies to foreign industries should be combatted. I read with interest that the Secretary of Energy is preparing trade actions against the dumping of enriched uranium in this Country. How do you see the assistance provided by the French Government to its enrichment complex and the practices of that enrichment complex as differing from the assistance that the Canadian Government provided the Eldorado uranium company in transferring its stockpile to them which has a fair market value of $300 million? Or for that matter, the fact that some Canadian production is now selling for upwards of $75/Lb in Canada and more like $18/Lb in the U.S.?

A: The Trade Agreements Act of 1979 provides protection to U.S. industries against predatory pricing and other illegal inducements from foreign organizations. This protection is afforded to all U.S. industries, including the uranium enrichment and uranium mining industries. DOE is reviewing recent transactions concerning sales of separative work in the U.S. by foreign enrichment producers. If it is determined that sufficient evidence exists to support the filing of an antidumping and/or countervailing duty petitions, DOE intends to petition for relief. The uranium mining and milling industry may wish to consider taking similar action.

Senator Domenici Question 5 (Second Set)

Q: The Department included Canadian production along with U.S. production in its analysis of whether or not the United States could withstand an embargo of uranium. Why did you make this decision?

ADDITIONAL QUESTION: It seems to me that this is a very similar situation that we faced with Australian policies in 1981. In Mr. Evered's written testimony he explains that we have changed our assumptions about Australian production only after the fact. Isn't it more prudent that we anticipate rather than react to changes like that? Shouldn't we do the analysis without Canada?

A: The Energy Information Administration, as a general rule, bases its forecasts on existing statutes and regulations at the time of assessment. Potential future changes in government programs that may affect energy industries are not generally included in our baseline forecast assumptions.

The President's Report examines a national security emergency scenario, consistent with the type of analysis employed by the Department of Commerce in the conduct of a national security investigation under the provisions of Section 232 of the Trade Expansion Act of 1962 (19 U.S.C. 1862). Under the scenario presented in the report, joint United States and Canadian production capability is compared with joint commercial uranium requirements (as shown in Table 21 on page 65 of the report).

The assumption that Canadian uranium would be available to the United States, if needed under a national security emergency, is based upon a long-standing agreement between the United States and Canada, which is detailed in Title 15 of the Code of Federal Regulations (15 CFR 330). Given this agreement and the long history of close cooperation between the U.S. and Canada on economic and defense matters, we believe the assumption used in the report is appropriate.

With regard to anticipating political events, it clearly would be useful to correctly anticipate major political shifts, but it is very rare that we have much foresight about such shifts. However, the uranium industry viability criteria, promulgated in October 1983, are designed to be responsive to this concern. In the implementation of these criteria, we will be able to estimate the impacts of a range of unanticipated future events.

The question of whether or not United States capacity alone would be sufficient to meet all domestic requirements is being examined as part of the industry's supply response capability for the Secretary's viability report. However, I should point out that the possibility of a total import supply disruption is considered extremely remote.

Senator Domenici - Question 6 (Second Set)

Q: It seems to me that this is a very similar situation that we faced with Australian policies in 1981. In Mr. Evered's written testimony he explains that we have changed our assumptions about Australian production only after the fact. Isn't it more prudent that we anticipate rather than react to changes like that? Shouldn't we do the analysis without Canada?

A: This question was answered under the previous question (Q.5).

Senator Simpson - Question 1

Q. Mr. Secretary, in March of 1980 there were over 5400 people employed in Wyoming uranium mines and mills. As of the end of last month, the level of employment in my state had dropped to 857. Fewer than one-half of the mills in the state are operating, and those that continue are operating at sharply reduced levels. All indications point to a continuing and extended decline in this industry, from the reports I am hearing. Why do those facts seem to point in precisely the opposite direction from what you have described in this report?

A. Although the President's Report does not contain State-level information on employment, it does contain nationwide employment data which reflect the declining employment trend you indicate for your State of Wyoming. The employment data in the report show that employment in the industry (in person-years) grew rapidly from about 6,600 in 1973 to a peak of 22,200 in 1979. Since 1979, the data show the trend has reversed, with employment in 1983 returning to the levels of the early 1970's. The historical data on operating mills in the United States (Table 12 on page 30 of the report) also portrays a similar picture to the one in your state, with 12 operating mills in 1983 compared to 22 in 1980.

As demand for uranium is projected to increase and as inventories are drawn down to desired levels, the market price for uranium is expected to rise and domestic production, and thus employment in the domestic industry, is also expected to increase moderately. Employment is projected to increase from an estimated total employment of about 6,000 person years in 1983 to a range of 10,000 to 15,000 by the mid-1990's. However, while the report contains projections of increasing employment after the next couple of years, the industry is not expected to regain its 1979 peak employment level over the projection period.

Senator Simpson - Question 2

Q: If the trends in my state continue--where we have witnessed an average decline in employment of over 30 percent per year over the past three years--we will be down to close to 200 people employed in the Wyoming uranium business in about three years. I gather from your report that this continuing decline over the next three years is, in fact, exactly what you are predicting. What puzzles me about this report is your conclusion that, after a few more years of hardship, production and employment will "steadily increase" through the balance of this century. How can this possibly happen when the mines and mills close down and, as some are doing, the mills are dismantled, and the financial backing that is now drying up no longer exists?

A: As you state, we do project a continuing downward trend in production, capital expenditures, and employment over the next few years as inventories are drawn down and new import contracts capture the majority of currently unfilled domestic requirements. Only after 1990, is domestic production expected to show a gradual increase, although projected production levels do not regain the peak levels of the late 1970's. As you suggest, there will be start-up costs associated with this projected gradual recovery of the domestic uranium industry. The industry is expected to be able to respond as market factors, such as decreasing inventory levels and higher unfilled requirements, encourage gradual expansion. Of course, prices for new contract deliveries will have to increase as an economic incentive for industry expansion. The President's Report includes projections of increasing uranium prices in the 1990's.

The Energy Information Administration recently conducted a "Uranium Industry Financial Survey", Form EIA-854, to determine the historical and current financial status of the industry for the upcoming viability assessment by the Secretary of Energy. That report will address the issue of the financial capability of the industry in more detail.

Senator Simpson - Question 3

Q: Over the past two or three years, we have virtually regulated this industry into its grave -- EPA is essentially treating the low-toxicity, high-volume mill tailings wastes the same as high-toxicity chemical wastes; there is a proposal on the table for further regulation of underground uranium mines; and the House has passed a Superfund bill that imposes yet a further tax on uranium oxide. In fact, it is next to impossible to mine uranium economically, with these and other restrictions and burdens -- leading many companies to get out of the business. Is it realistic to expect -- as you have suggested -- that if these companies get out of uranium mining over the next few years, that they will return to the business, given their previous experience?

A: It is true that events in the recent past have adversely affected the domestic uranium industry. The regulatory and legislative events cited are examples of government actions that affect the marketplace. We will continue our efforts to reduce the adverse impact of regulations that are either unnecessary or excessively burdensome. It is unfortunate that these events are occurring during a period of significantly reduced demand for uranium due to the deferral and cancellation of nuclear powerplants. Reduced demand, rather than restrictions, appears to be the basic cause of companies leaving the business -- as normally results in an industry with excess capacity.

As the market stabilizes, existing inventories are expected to be worked off, and the demand for uranium is projected to increase. Under these conditions, potential uranium producers would see an opportunity to make a profit and should respond by entering the industry. Based on years of observing firms responding to market and profit opportunities, we believe that it is realistic to expect that some old companies will re-enter and that some new companies will become engaged in the uranium mining and milling business if prices increase as forecasted.

Senator Simpson - Question 4

Q: One final question--on pages 64 and 65 of your report, you discuss what might happen if there were an interruption of supply from the rest of the world, and you point out that "the two countries would share uranium supplies to meet their collective requirements for uranium." If your scenario were to happen, would it be possible for us to meet all of our domestic demand without the Canadian uranium? And second, are you suggesting here that in assessing whether this country has a "viable" domestic uranium industry, we should really be looking at whether we have a "viable" supply--and for that purpose, we can expect to rely on Canadian uranium?

A: The discussion of a national security emergency on pages 64 and 65 of the President's Report assumes a situation of national industrial mobilization. The question of whether or not domestic production capability, alone, would be sufficient to meet domestic demand under this scenario was not examined for the President's Report.

The criteria, established by rule to assess the viability of the domestic uranium mining and milling industry in the areas of Resource Capability, Supply Response Capability, and Financial Capability are based on domestic capability to meet domestic uranium supply security requirements. The Secretary of Energy's assessment in these areas will be based upon information on the domestic industry's ability to respond to a range of hypothetical import supply disruptions. Under a given import supply disruption scenario, for the purpose of applying the uranium industry viability criteria, we do not assume Canadian (or any other foreign) uranium supplies will fill the void left by the disruption. At one end of the range of possible import supply disruptions is a total disruption, which is the equivalent to the U.S. uranium industry's supplying all U.S. requirements.

A fourth industry attribute--Import Commitment Dependency--which is not related to any import supply disruption scenario will also be examined as part of the viability assessment.

Senator Bingaman Question

Q. Mr. Evered: Can you please investigate the issue raised by Mr. Rausch in his testimony concerning the disparity between the price paid for Canadian uranium contracts in Canada and in the U.S. Please explain how the industry was able to gain access to this information yet the Department was unaware of the problem.

A. The Energy Information Administration (EIA) collects information on the uranium industry from all companies engaged in domestic uranium commerce. The EIA statutory mandate does not include the authority to collect information on energy marketing by foreign companies within their own countries. Although we do participate in international energy information exchange forums, such as the OECD Nuclear Energy Agency, we do not have any specific information on the price paid for Canadian uranium in Canada. We would be glad to review any information the Committee can provide in this area and to provide comments to the Committee on any disparity between prices paid for Canadian uranium in the United States and those paid in Canada.

Final Question from Senator Domenici from Inquiry Letter Dated 9/24/84

Q: In the EIA study entitled "Survey of United States Uranium Marketing Activity--1983," published in August 1984 it is reported in Table 3 (page 9) that of the 24.2 million pounds of U_3O_8 delivered to utilities from domestic suppliers 5.4 million pounds was of foreign origin. On page 25 of that same report, it is stated that 3.8 million pounds of uranium were imported directly by five utilities.

Given these figures, is it correct to say that 32.8% of the uranium committed for delivery, either directly or through a domestic supplier in 1983, was of foreign origin?

A: The figures you quote are correct for actual 1983 deliveries to domestic utilities, but would not be correct for commitments for delivery beyond 1983. These figures do not account for deliveries between utilities.

Department of Energy
Washington, D.C. 20585

December 31, 1984

Honorable Pete V. Domenici
Chairman, Subcommittee on Energy
  Research and Development
Committee on Energy and Natural
  Resources
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

On September 12, 1984, Danny J. Boggs, J. Eric Evered, and R. Gene Clark, appeared before your Subcommittee to discuss the Department of Energy's/Energy Information Administration's comprehensive review of the status of the domestic uranium mining and milling industry.

Following that hearing, you submitted written questions for response to supplement the record and additional questions for our response. On September 27, we sent you the answers to both sets of questions. At that time, we indicated in our response to your question 7 that the EIA review of the Colorado Nuclear Corporation's critique of the President's study would be forthcoming. The review has now been completed and is enclosed.

If you have any questions, please call Hank Edler or Tom Pretorius of my staff on 252-4277. They will be happy to assist you.

Sincerely,

Robert G. Rabben
Assistant General Counsel
for Legislation

Enclosure

bcc: Mr. Paul Gilman
     Mr. Al Astrin

Energy Information Administration Response to the Colorado Nuclear Corporation Critique of the President's May 31, 1984, Report on the Domestic Uranium Mining and Milling Industry

In September 1984, the Colorado Nuclear Corporation (CNC), under contract to the American Mining Congress, prepared a report titled Review and Critique of United States Uranium Mining and Milling Industry: A Comprehensive Review.

The CNC report does less to provide an in-depth analysis of the President's report than to present alternative projections of industry behavior under different assumed conditions than those hypothesized in the President's report. The CNC report used projections of the domestic growth of nuclear power that were considerably lower in the long term than those used by the EIA. This, together with the use of differing versions of the EUREKA computer model of the uranium industry, is the major cause of the differences in the respective projections. Any uranium market projections into the next decade require a great many assumptions to be made--many of them being highly speculative. Therefore, it is incorrect to state that one projection is right and the other wrong.

The CNC's projections of domestic uranium demand and production are substantially lower than the Energy Information Administration's (EIA) forecasts contained in the President's report, especially in the 1990's. For the year 2000, CNC forecasts a domestic uranium demand of 33 million pounds and domestic production of about 4 million pounds per year, while EIA projected a demand of 60 million pounds and production in the 35 million pound range. Due to these different domestic production levels and demands for uranium and different methodological treatments for imports used by CNC, the forecasts of the proportion of demand met by imports differs substantially between the two organizations. The CNC projects import penetration levels of over 70 percent in the mid-1990's, while EIA estimates are about 40 percent.

The purpose of this paper is to discuss the reasons for the differences in those two forecasts.

Comparison of CNC and EIA Versions of EUREKA

The EUREKA model versions, respectively used by CNC and EIA, are quite different. Both versions of the EUREKA model have undergone many structural changes. For example, EIA has modified the model to simulate possible federal policy decisions and has modified the manner in which inventories and imports are used to avoid a shortage of uranium in any year. The CNC version of EUREKA has several input parameters that are not included in EIA's version, and the EIA version of EUREKA will not even operate successfully with the input data represented by CNC as its "base case."

Additionally, both forms of EUREKA differ in their treatment of the availability of imports to the domestic market. The EIA has developed an import supply function based on the relative costs of producing uranium from specific domestic and foreign uranium production centers. The function provides a maximum import level for each level of domestic production capacity. The CNC determined available import levels by first estimating the amount of foreign reserves in different cost categories. This was accomplished by examining various international sources of data, and adjusting resource definitions and cost estimates across countries to arrive at a consistent set of information. Estimates were then made to distribute these quantities from 1985 to 2000. The different treatment of imports is addressed later in this document.

The differences in the CNC and EIA versions of the EUREKA model make it difficult to determine whether input assumptions or model structure are the primary reasons for obtaining differences in results.

Influence of Domestic Uranium Demand Assumptions on the Results

The EIA's uranium demand projections were developed in late 1982 and early 1983. These were the most recent EIA projections at the time of preparation of the President's report during late 1983 and early 1984. The CNC, on the other hand, developed their uranium demand forecasts in the late summer of 1984. Due to the nuclear power plant cancellations and delays that occurred during 1984, CNC's demand assumptions are substantially lower than EIA's. For example, EIA assumed domestic uranium demands of 31, 40, 48, and 60 million pounds of U_3O_8 in 1985, 1990, 1995, and 2000, respectively. The CNC, however, used demands of 31, 36, 36, and 33 million pounds of U_3O_8 in the same years. Thus, CNC and EIA demands matched fairly well until the 1990's when CNC and EIA demands diverge, differing by a factor of almost 2 in the year 2000.

The EIA has made more recent projections of domestic demand for uranium of 35, 42, and 41 million pounds of U_3O_8 in 1990, 1995, and 2000, respectively. These demands are significantly reduced from those in the President's report but are still higher than CNC's for the decade of the 1990's. The EIA's analysis with its lower demands results in domestic uranium production leveling off at about 20 million pounds annually throughout the 1990's. Import penetration also levels off throughout the 1990's, at about 45 percent of U.S. requirements.

Reduced demands in EIA's version of EUREKA lead to (1) domestic uranium production levels that are still twice those forecast by CNC in the late 1990's, and (2) import penetration levels substantially lower than projected by CNC.

Structural Representation of Import Supplies

The EIA representation of import penetration is as follows. A given expected price level results in an associated level of domestic uranium production capacity and, thus, a correlated level of potential import supply available at the same price. The EIA (like CNC) assumes that a desired fraction of future demand will become "committed" by buyers through supply contracts. (The fraction is higher for close-in years and lower for years farther into the future.)

When the desired level of commitments is higher than commitments in place, buyers are assumed to go to the marketplace to sign new contracts. Only the domestic and import supplies that can be profitably offered at the expected price are assumed to be available. At a given price, domestic buyers are assumed to prefer the more secure domestic supplies. Domestic producers, therefore, have first priority at the desired level of new commitments, and import contracts fill any remaining gap between desired and in-place commitments.[1]

Thus, if domestic producers can compete at the projected market price, they are the priority suppliers in EIA's version of EUREKA. On the other hand, if the sum of excess inventories, uncommitted domestic production capacity, and uncommitted import supplies exceeds uncommitted uranium requirements over a future period, the market price is adjusted downward for the subsequent year. This lower market price results in a lower quantity of competitive domestic production and imports.

The CNC version of EUREKA handles imports in a very different manner, as follows. For any future year, CNC assumes imports can be no greater than the largest annual amount already under contract for all future years, unless the market price has risen above an input "trigger" level. In the latter condition, there is no maximum constraint on import availability, other than that determined by overall maximum annual and cumulative import growth rates.

In CNC-EUREKA, domestic demand is reduced by the amount of net imports under contract. Consequently, price is not determined by any potential import supplies, only those already under contract. That is, price movement is based solely on projected information about excesses or shortages in U.S. production capacity, and the price function is indifferent to whether there is a tight worldwide market or a huge surplus of production capacity in the foreign sector. However, the specified trigger price array for foreign uranium implicitly reflects the relative status of the world market and is a principal factor in determining the import levels.

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[1] The second paragraph of page 46 of the President's report erroneously indicates that the model assumes total indifference to the source of uranium for new commitments.

This approach differs from EIA's and leads to differences in results. The CNC base case market price rises above $40 per pound of U_3O_8 after 1986, but domestic production responds with an increase of only 3,000 tons annually. This is surprising because part of CNC's input data includes 9,800 tons of new annual production capacity that could come on-line at this price (rising to 12,000 tons of new capacity at $45 per pound).

In summary, the EIA-EUREKA import representation assumes that price is determined by a worldwide market balance, whereas CNC-EUREKA assumes that price is determined by only a domestic market balance. Furthermore, CNC's version assumes that foreign uranium producers can respond instantaneously to price increases, whereas U.S. producers are severely impacted by low prices and are, at best, slow to respond to high prices. The CNC states that it bases this assumption on its observation that many foreign producers plan for excess production capacity and, therefore, can react quickly.

Comparison of Results with Survey Data and Projections by Other Organizations

It is useful to examine forecasts published by other organizations and the data collected from surveys of domestic uranium producers to obtain a broader framework for judging the reasonableness of CNC and EIA forecasts. Other groups, however, do not provide projections on the total range of variables needed to examine a domestic supply and demand balance (i.e., production, imports, exports, inventory changes) and the associated market prices. There are several organizations, nevertheless, which forecast values for some of the variables.

The "Survey of United States Uranium Marketing Activity" is an annual survey conducted by EIA. In this survey, domestic uranium producers provide information on the amount of U_3O_8 committed under contract for delivery to domestic utilities each year through 2001 and the price in dollars per pound of U_3O_8. In addition, the quantity of uncommitted uranium, available for sale each year through 1993 by required-price category, is given. Table 1 summarizes the producer information collected on the 1983 survey.

There is a major inconsistency in the CNC September 1984 forecast with this producer-supplied data. The CNC projects uranium prices escalating to $50 per pound (in 1984 dollars) in the late 1980's and staying at that level through the middle 1990's. CNC's forecasts of domestic production, however, sink to all time lows during this period of time. For example, CNC projects domestic production of 8 million pounds in 1989 and 6 million pounds in

1995. Projected production in other years is somewhat higher. These low production estimates are inconsistent with prices as high as $53 per pound. In fact, domestic producers have reported to EIA that at prices of $50 per pound they could produce about 12 million pounds, in 1989 for example, over and above the 14 million pounds of U.S. origin uranium already committed for delivery in that year. Thus, using 1989 as an example, producers report to us that they are prepared to produce about 26 million pounds or three times the amount CNC projects at prices of $50 per pound. However, there is the possibility that the data being reported today by the producers will in fact change significantly over time as more production center shutdowns occur.

In May 1984, NUEXCO published projections of domestic production though the year 1997. Domestic production is forecast by NUEXCO to increase to 21 million pounds by 1990, then increase to 22 million pounds in 1992 and gradually decrease to 17 million pounds by 1997. These forecasts are consistent with EIA's revised projections through the mid-1990's with low demand, but diverge slightly (with NUEXCO production declining and EIA production staying constant) in the late 1990's. The NUEXCO and CNC forecasts of production are inconsistent; NUEXCO's levels are substantially higher, especially in the mid 1990's.

The Nuclear Assurance Corporation's (NAC) Uranium Supply Analysis (USA) system currently projects domestic production dropping to 15 million pounds in 1990, rising slightly to 17 million pounds in 1995, and about 20 million pounds in the year 2000. The NAC domestic production forecasts are based on uranium demands of 44, 40, 44, and 44 million pounds for 1985, 1990, 1995, and 2000, respectively. Thus, the NAC demands are higher than CNC's but similar to EIA's demands for the 1990's. The NAC system does not report imports directly, but import penetration can be extracted from the projections. The resulting measure of import penetration from the NAC model takes on values of 40, 62, 65, and 50 percent in 1985, 1990, 1995, and 2000, respectively.

Both NUEXCO and NAC have released revised uranium demand projections, based on their respective estimates of the impact of the Department of Energy's (DOE) new Utility Services Enrichment Contract (USEC). The NUEXCO estimates were presented in early September 1984 at the Uranium Institute meeting in London, England. Although it is not clear how NUEXCO specifically incorporated the USEC into their analysis, they estimate about a 20-percent reduction in DOE's uranium enrichment feed requirement over the 1984-1991 period.

The NAC revised projections were presented in early October 1984 at the Atomic Industrial Forum conference in Keystone, Colorado. The NAC estimates a slightly smaller impact of the USEC contract on uranium demand than NUEXCO's. The NAC estimates concurrent

U.S. uranium production of 14 million pounds in 1990, 15 million in 1995, and 20 million in 2000. Both NUEXCO and NAC now estimate lower uranium demands because of the USEC. This would imply a downward revision in their domestic production projections, although not necessarily on a one-to-one basis.

Conclusion

The EIA has analyzed the forecasts and methodology employed by CNC in its review of the EIA projections. Several factors are important in attempting to account for the differences. One is assumptions concerning levels of demand, and the other is varying methodologies for determining the level of imports. The EIA demand assumptions were outdated and, therefore, too high. On the other hand, EIA's methodology for determining imports more directly simulates a competitive international uranium market than the methodology used by CNC.

To obtain a more meaningful comparison of uranium market projections, EIA has revised its forecasts by incorporating more recent uranium demand information. These revised forecasts are compared with forecasts from three other organizations - CNC, NAC, and NUEXCO. Because each of these organizations has varying assumptions and models, a range of forecasts is observed. For domestic production, a range of 10 to 20 million pounds is forecast for 1990, and a range of 4 to 20 million pounds is forecast for 2000. In both years, the preponderance of the forecasts are on the high end of this range, near 20 million pounds. For import penetration expressed as the level of imports as a proportion of domestic demand, the range is 45 to 62 percent for 1990, and 45 to 68 percent in 2000. Through the mid-1990's the projections of import penetration show a preponderance toward the upper end of the range, whereas, in the late 1990's the preponderance of forecasts is toward the low end of the range.

Table 1. Uranium of U.S. Origin Reported to be Available for Sale by Domestic Suppliers (million pounds U_3O_8)

	Survey Data on Available Uranium			
	Committed to Contracts	Uncommitted and Available for		
		Less than $30	Less than $50	Any Price
1984	12.0	4.1	6.5	7.9
1985	11.7	3.5	8.9	9.8
1986	13.5	3.4	13.7	14.5
1987	14.9	3.4	13.6	15.3
1988	13.2	3.9	14.3	17.5
1989	14.3	3.9	12.3	15.1
1990	12.5	3.6	11.2	14.1
1991	12.9	3.6	11.2	14.1
1992	12.5	2.6	5.5	7.5

Source: Energy Information Administration, Survey of United States Uranium Marketing Activity 1983, DOE/EIA-0403(83) (Washington, D.C., August 1984).

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DONALD O. RAUSCH
PRESIDENT
CHIEF EXECUTIVE OFFICER

September 20, 1984

Senator Pete V. Domenici
4329 Dirksen Office Building
Washington, D.C. 20510

Dear Senator Domenici:

Answers in response to your letter of September 13, 1984, regarding questions relating to my testimony before the Energy Research and Development Subcommittee are herewith respectively submitted. I am also attaching answers to the questions of Senator Alan K. Simpson. For your convenience I shall first state the question and then submit my answer.

Question - In your testimony you cite substantial problems with the U.S. uranium industry resulting from U.S. energy policies. I gather from your comments that you do not see a bright future for U.S. uranium producers.

If that is the case, I am interested in the fact that Western Nuclear has a development project under way in Texas. What is it that gives your company your confidence to invest money today in an industry that has, in your words, very little future?

Answer - Our decision to invest in an in situ leach mine (which does not require construction of a uranium mill or tailings pond) in Texas was based on Western Nuclear's desire to find and develop higher grade and lower cost deposits in order to compete with foreign subsidized imports. It is our belief that the deposit under development in Texas will be one of the lower cost deposits in the United States.

Question - The Canadians argue that their export policy requires that an export price cannot be less than the price charged to Canadian utilities. Yet you claim there is an approximate $55.00 difference between what Canadian utilities pay for their fuel supplies, and what is charged to U.S. buyers of Canadian yellowcake.

Would you, for the record, submit documentation for this statement?

Answer - Mr. Chairman, Canada has a policy of not selling uranium for export at prices less than in its domestic market. It also has a policy of encouraging export of surplus production to the United States and that evidently trumps their purported policy against differential pricing. Obviously we here at Western Nuclear are only privy to publicly available information published by the wire-services and the trade press, but there is ample information from those sources to show what is occurring. In response to your request, I am submitting news clippings indicating Ontario Hydro's 1984 purchase price of $73.40 (Cdn) per pound which rises to $98.00 per pound in 1990. I am also supplying news clippings showing the prices Canadian producers are offering to the U.S. market. These prices are in the $17 to $18 range.

I am also submitting for the record a portion of Ontario Hydro's 1983 Annual Report: Fuel Supply Activities. (The 1984 Ontario Hydro annual fuel report will not be available until year-end.) Page 10 of the Nuclear Fuel Section of Ontario Hydro's annual report shows that Ontario Hydro has long-term uranium supply contracts totalling 77,170 Mg(U) or 200,631,112 pounds U_3O_8. Page 16 states Ontario Hydro has placed a minimum purchase value on these U_3O_8 concentrates of $9.377 billion.

Mr. Chairman, page 11 of the introduction section indicates that Ontario Hydro advanced an additional $87 million to Rio Algom in 1983 for start-up of its Stanleigh mine. This represents a total investment by Ontario Hydro of $351 million. In addition, Ontario Hydro made additional advances to Denison Mines in 1983 for an investment total of $279.5 million at year-end.

Mr. Chairman, Ontario Hydro is a government-owned utility. These advances total over $630 million and when added to the $9.377 billion in long-term purchase contracts at extremely high prices, it is easy to see why Canada's uranium industry is flourishing and ours is dying.

Question - What effect does adding a surcharge on the variable tails assay provision in the new enrichment contract have on uranium demand?

Answer - Mr. Chairman, the variable tails surcharge seriously reduces demand. Nuclear Resources International (NRI) in a recent report prepared for Kerr-McGee Corporation estimates the surcharge and other restrictions on choosing an optimal tails assay reduced demand for uranium by two to three million pounds per year. This is 20% to 30% of expected U.S. uranium production next year. This is equivalent to the output of two to three uranium mills at full capacity. Industry capacity is now only 20% of capacity and 7 of 24 mills are operating. The surcharge obviously seriously hurts domestic producers. We understand Kerr-McGee is submitting the NRI report for the record. Our own estimates are compatible with those of NRI. Mr. Chairman, please note that the adverse impact of the surcharge is felt not only by uranium companies in the form missing of demand, but also by utility ratepayers in the form of higher nuclear fuel prices. I would like also to note, Mr. Chairman, that, as the referenced NRI report indicates, numerous other DOE policies (e.g., deferral of SWU's, one-time cut-backs on SWU and feed requirements, "Split Tails") sales are also reducing demand by millions of pounds of uranium per year.

For the sake of completness, allow me to illustrate how the surcharge adversely affects uranium demand. At today's Spot Market price of $17.50 per pound, a utility would select an enrichment tails assay of 0.33%. In the new contract, however, a utility would select a tails assay of 0.23% due to the 7% surcharge for each 0.01% increase over 0.20% up to a maximum of 0.30% based on the new $135.00 Separative Work Units (SWU).

The following table shows the trade off between SWU and uranium at various tails assays. At the current $17.50 per pound Spot Market price a utility would elect to deliver about 486,940 pounds of U_3O_8 to DOE and purchase about 83,000 SWU for a standard reload for a 1,000 megawatt reactor. Due to financial penalties in the new enrichment contract for increases in the tails assay, a utility would elect to deliver about 400,000 pounds of U_3O_8 and purchase approximately 110,000 SWU. This equates to buying 27,000 more SWU's from DOE and 86,940 pounds less U_3O_8 from producers.

THE EFFECT OF TAILS ASSAY ON SEPARATIVE WORK UNITS

(Reload: 27,000 kgU Enriched Product at 3.0% U235)

Tails Assay(%)	Input Quantities Separative Work Units	Input Quantities Uranium Feed (lbs. U308)	Changes in Requirements (Base 0.20% Tails) Decrease In SWU (%)	Changes in Requirements (Base 0.20% Tails) Increase In Feed (%)
0.20	116,300	386,600	N/A	N/A
0.25	102,900	420,900	13,400(11.5)	35,300(8.9)
0.30	92,500	463,500	23,800(20.5)	76,900(19.9)
0.35	79,600	502,580	36,700(32.0)	115,980(30.)

Mr. Chairman, I wish to thank you for your interest in maintaining a viable domestic uranium industry. I only wish DOE had similar intentions. Should you need any additional information or documentation of information, please feel free to contact me.

Sincerely yours,

Donald O. Rausch

DATE: September 20, 1984

RE: Response to Questions From Senator Alan Simpson, Wyoming
From Mr. Donald O. Rausch, President, Western Nuclear, Inc.

QUESTION: Many of you represent companies that have uranium mines and mills on standby, awaiting an improvement in market conditions. Is it reasonable to expect that, if current trends continue for the next few years--as DOE has predicted--that you will remain in the business for much longer?

ANSWER: You will recall you asked this question of those industry representatives who testified at the hearings. Only Pathfinder Mines Corporation, a unit of the French government corporation Cogema, Inc., responded that it would remain in business if the "current trend continues".

We also ask you to note that the costs for maintaining a uranium mine and mill on a standby basis are enormous. For example, it costs Western Nuclear, Inc. $5 million per year to maintain its Jeffrey City operations on a standby basis.

QUESTION: Once you have placed a mill on standby, what does it take to bring that operation back on line, and what kind of time and resources have to be devoted to such an effort?

ANSWER: When a mill is placed on standby basis, amendments to the existing NRC operating license are required to reflect the shutdown mode. The degree to which you amend your license with NRC generally determines the amount of time it will require for NRC approval to start-up. In cases where mills have been placed on a "mothball" basis, we understand from NRC it will require one year to obtain NRC approval to commence operations.

At our Jeffrey City facility, shut down since mid 1981, we estimate six to seven months of necessary start-up preparations before operations can be brought back on line.

We estimate the costs for the first six months would be $2,200,000 for the mill only. These costs include manpower, operating parts and supplies, plant repair, and equipment maintenance and replacement.

The estimated costs to bring the underground mines, surface facilities, and the Town Site up to a start-up mode within six months would be $5,000,000.

QUESTION: I gather from some of the reports that I have heard out of the recent Uranium Institute meeting in London that the foreign producers have, by and large, written off the U.S. uranium industry as a long-term competitive force in the market. I wonder if each of you could comment just briefly on what you see as the reaction of the Canadians and Australians to the conditions of the industry in this Country, and the steps that they are pursuing to express their presence in the domestic market?

ANSWER: Not only have foreign producers written off the U.S. uranium industry as a long-term competitive force, but foreign utilities have also expressed concern about the future of our industry. During a recent meeting with a foreign utility regarding a long-term uranium supply contract, the utility asked many questions about the future viability and dependability of our industry.

I might also add that many foreign producers have stated publicly they do not expect the U.S. industry to survive. Many foreign uranium companies are opening sales offices in the U.S. in order to establish a presence. They are offering very attractive long-term contracts with discounts from Spot Market price. Whether these contracts can be fulfilled as currently negotiated remains to be seen; more than likely they will be renegotiated at higher prices in the future. If there is no U.S. uranium industry, our utilities will undoubtedly have to pay substantially higher prices.

QUESTION: Some of you have pointed out in your testimony that the Department of Energy in now engaged in selling uranium from the U.S. stockpile, and that this action is serving to reduce domestic demand even further and, as a result, is eliminating jobs in the commercial uranium industry. How significant is the DOE's presence in the commercial market for uranium, how much uranium is coming on the market from the stockpile, and what terms are available for uranium from the stockpile?

ANSWER: The Department of Energy sells uranium into the market through two methods: (a) the sales of preproduced enriched uranium, and (b) sale of uranium through the "Split Tails" operation mode at the enrichment plants.

In reviewing DOE's annual enrichment reports from 1979 through 1983, the agency states it sold 20.3 million pounds of uranium equivalent. These sales averaged between 3.2 million pounds and 4.7 million pounds per year. DOE booked sales of $570 million during that five-year period and net income of $362 million.

In 1983, DOE sold 4.2 million pounds and netted $118 million on sales of $160 million. These sales represented 20 percent of domestic uranium production and the net income was greater than the **entire domestic uranium industry combined!**

In "Split Tails" sales, DOE substitutes the use of expensive purchased electricity in the enrichment process by supplying more uranium feed from the stockpile than is actually delivered by the customer. The following table shows the difference between uranium feed and separative work units (SWU) at various tails assays for a standard reload for a 1,000 megawatt reactor.

EFFECT OF SPLIT TAILS ON REQUIREMENTS FOR 1000 MWe PRESSURIZED WATER REACTOR

(Reload: 27,000 kgU Enriched Product at 3.0 Percent U235)

	Input Quantities		Changes in Requirements (Base 0.20% Tails)	
Tails Assay(%)	Separative Work Units	Uranium Feed (lbs. U308)	Decrease In SWU (%)	Increase In Feed (%)
0/20	116,300	386,600	N/A	N/A
0.25	102,900	420,900	13,400(11.5)	35,300(8.9)
0.30	92,500	463,500	23,800(20.5)	76,900(19.9)
0.35	79,600	502,580	36,700(32.0)	115,980(30.0)

It is interesting to note there is about a 30 percent difference between SWU purchases and uranium deliveries between a 0.20% and 0.35% tails assay. In DOE's new Utility Service Enrichment Contract, utilities must pay financial penalties on each 0.01% increase in tails assay up to a 0.30 percent maximum. At today's $17.50 Spot Market price a utility would select a 0.33 percent tails assay. The financial penalties, however, force the utility to select a 0.23 percent assay.

In DOE's new five-year operating plan for the enrichment plants, the agency intends to run at a 0.32 to 0.35 percent tails assay. The DOE will then supply about 53 million pounds of U_3O_8 from the stockpile to make up for the feed shortage. The agency will then take the money from the SWU work and book it as sales income for the uranium. If the DOE would let the uranium industry supply this feed it would greatly help our industry.

were informed of the changes the department was considering.

In fact, GAO received sufficient data on the changes that they were able to testify on March 1, 1984, on them. On March 16, 1984, GAO and your (Ottinger's) staff received another briefing on the proposed changes, and on April 3, 1984, a letter was sent to all the cognizant congressional committees notifying them of the changes."

KRSKO REAPPRAISING DOE CONTRACT

A DOE delegation met in Zagreb, Yugoslavia last week with officials from Nuklearna Elektrana Krsko (NEK) to discuss revision of their thirty-year enrichment contract. NEK reportedly requested the meeting to explore the possibilities of obtaining more favorable financial terms and in lieu of this, the consequences of NEK's severing of its DOE contract.

The contract has already been renegotiated once. In 1979 "flexible" conditions were granted which reduced the period of forward booking from ten to five years and allowed a 20 percent leeway on quantities and deadlines.

Although NEK officials decline to discuss the reasons behind their request for new talks, well-informed sources say it has been prompted by attractive offers being made to NEK by European enrichment vendors which are said to be adding the enticement of compensation trading arrangements. Cogema is specifically mentioned as making overtures like this, which promise a way around Yugoslavia's current lack of foreign exchange and the high interest rates U.S. banks charge Yugoslav firms.

Meanwhile, a DOE source said that based on the meetings with the NEK, he expected to receive from the utility a letter of intent to convert to the new DOE contract before NEK's next scheduled delivery of material from DOE in September.

Another reason for NEK's taking a harder look at the DOE contract may also be its "active consideration" of a longer refueling cycle. Apart from Westinghouse, both Framatome and Kraftwerk Union are said to have put in proposals for a switch to a longer cycle.—*Nada Stanic, Belgrade.*

TEPCO OFFICIAL SEES JAPANESE U308 SUPPLIES ADEQUATE WELL INTO 1990s

Because of a sharp cutback over the past ten years in Tepco's nuclear plant development plans, Yasuji Suzuki, deputy general manager for fuels at Tokoyo Electric Power Co. says uranium surpluses for Japanese utilities now total approximately 40-million pounds U308, and "the figure is expected to keep increasing each year until about 1990." Suzuki told participants at an international nuclear conference June 4 in Saskatoon, Canada that the size of the surplus means "the existing contracted quantity is sufficient to cover total Japanese demand well into the latter half of the 1990s."

"Up to now," Suzuki added, "Japanese utilities have arranged for supply of a total of 191,000 short tons (190 metric tons) of U308." Suzuki added that while the Japanese government and utilities "recognize the necessity of stockpiles," an understanding on the size of any stockpile "has not yet been agreed upon at a governmental or national level, partly because quite a big inventory will continue to be held for the time being."

While 80% of Japan's uranium procurement has been through long-term contracts, Suzuki also said Japanese utilities "hope that producers will work together to bring some flexibility into these long-term arrangements so that their delivery schedules may be adjusted." Meanwhile, Suzuki said Japan is considering a combination of new long-term contracts and spot market contracts for future uranium buys in order to meet changing demands. He said Japanese utilities also will participate in more overseas uranium exploration and development projects "as a measure toward stabilizing supply."

PRICES FOR U308 TO ONTARIO HYDRO RANGE FROM $36/LB to $98/LB

Based on total figures in Ontario Hydro's 1985 rate submission now before the Ontario Energy Board, calculations show that Ontario Hydro took delivery of some 2.5-million pounds of Elliot Lake uranium concentrates in 1983 at an average cost of (Cdn) $49.14 per pound of U308. The utility also bought 702,000 lbs of uranium from Eldorado's Rabbit mine in Saskatchewan province for an average price of (Cdn) $39.90/lb. The Eldorado contract is part of some 17-million lbs of Saskatchewan uranium which Ontario Hydro negotiated two years ago while deferring a like amount of deliveries from Elliot Lake over the next two decades.

Eldorado Resources is supplying 3.7-million lbs from Rabbit Lake in the 1980-85 period. Eldorado and Uranerz Exploration & Mining Ltd. will together supply 13.5-million lbs over the next seven years from Key Lake. Key Lake deliveries will amount to about 260,000 lbs in 1985, another 1.56-million lbs annually for the next three years and 1.8-million lbs in each of the last three years. Hydro's submission shows that in 1982, Elliot Lake uranium cost the utility about $34/lb, while the Saskatchewan uranium with provincial royalties averaged about $37.20/lb that year. Both Denison and Rio Algom also are now in full production on Hydro contracts at Elliot Lake, and each will be delivering about 2-million lbs of U308 annually to Hydro.

Other figures submitted to the Ontario Energy Board in the current rate hearings show Hydro's uranium purchases have or will average about (Cdn) **$36.75/lb in 1982; $46.50/lb in 1983; about $73.40/lb in 1984 year; and approximately $80/lb in 1985. In the 1986-91 period, Hydro expects its uranium will cost between (Cdn) $91/lb and $98/lb.**

Government opposition was sharply critical of the Elliot Lake contracts signed in 1978, though an all-party legislative committee could find no specific basis for condemning them. Hydro admits that Elliot Lake uranium, which is relatively low grade and must be mined from deep hard-rock deposits, is more expensive than the high-grade Saskatchewan uranium now being produced at the vast Key Lake open pit operation. However, employment and economic benefits tied to the Elliot Lake uranium mines and refining facilities at Blind River are said to help offset the higher Elliot Lake region prices. "Elliot Lake uranium is always going to be on the high-priced end of world uranium. There is no question about that," Hydro's fuel manager Allan Holt told a Canadian legislative committee last year. But, he said 2,500 employees work at Elliot Lake mines. "As production expands and with the multiplier effect we are probably talking about 7,000 to 8,000 jobs involved."

Hydro submitted material comparing Hydro's weighted average price for a pound U308 with DOE's weighted average price for known contracts as of January 1, 1983. The material shows that where the Hydro price was about the same as the U.S. average at the beginning of last year, the utility is now paying a third more for Canadian uranium, primarily from Elliot Lake, than the average U.S. contract price. Over the next seven years, Hydro will be paying a third to a half more on their contracted purchases than the average U.S. contract price.

The contract terms for the Elliot Lake uranium are complex, but Hydro could give notice next year that would effectively allow renegotiation to be effective about 1993 on the Denison deal and 1989 with regard to Rio Algom. Hydro's fuel picture is further clouded by the fact that the 1978 contracts were predicated on further nuclear power plants being built after the 3600-Mw Darlington station was completed in 1991. But, Hydro has indicated that there are no plans on the drawing board for post-Darlington plants this century. In the short run, Hydro's uranium surplus also is exacerbated because two Pickering units, totalling 1100-Mw capacity are down for a three to four year period for replacement of pressure tubes.

As part of its (Cdn) $9.4-billion long-term commitment for uranium to 2020, Hydro advanced $280-million for Denison Mine's expansion from 7,100 to 15,000 tons per day of ore and (Cdn) $350-million for Rio Algom's rehabilitation of its Stanleigh mine, all dedicated to Hydro. **The interest-free loan is now to be repaid out of uranium sales to the utility. It represents about (Cdn) $70-million a year, or 36% of this year's nuclear fuel bill and 26% next year.**—*Ray Silver, Toronto*

NEW CANADIAN URANIUM PROJECTS UNLIKELY UNTIL DEMAND IMPROVES

Canada is sharply reducing its uranium exploration activities, and uranium mining in the country will be limited to the two already producing regions for the foreseeable future, according to officials of two top Canadian mining firms. David Roland, vice president of Rio Algom Ltd., said Saskatchewan's Athabasca Basin and the Elliot Lake region in eastern Ontario province will be the country's only two producing areas ~~for~~ some time to come because "uranium mine and mill capacity already in place, including idled capacity... far exceeds current and medium-term demand despite a continued healthy rate of increase in demand of some 6% per annum."

Roy Lloyd, chairman of the the Saskatchewan Mining Development Co., added that exploration expenditures "will continue to decline over the next five years, probably dropping to a low of about $10-million and then rising as productive capacity and consumption come more into balance." Lloyd said exploration expenditures peaked at $80-million in 1980, then declined to $70-million in 1981, $40-million in 1982, $24-million in 1983 and an estimated $18-million this year. Lloyd attributed the reduced spending to "high levels of inventory and the existence of known high-grade deposits that have reduced pressure to find new sources of supply."

Despite the exploration cutbacks and the presumption against development of new mines outside Saskatchewan province, Lloyd predicted that uranium production from Saskatchewan likely will climb to over 20% of worldwide production by 1995. Roland added that Rio Algom and Denison Mines "have forward sales commitments from the beginning of 1984 of 268-million pounds" or about the same quantity already mined by the two companies in the Elliot Lake region. Over 80-million pounds of that quantity are committed to exports under long-term contracts at an approximate value of $3-billion, Roland said.

RECOVERY FOR U.S. URANIUM PRODUCERS UNLIKELY ANYTIME IN NEAR FUTURE

While U.S. producers once dominated the worldwide uranium market, those producers are not likely to regain their status in the foreseeable future, according to participants and speakers attending an international nuclear conference at Saskatoon, Canada earlier this month. Chief among the reasons cited for the continued decline are high U.S. production costs, a worldwide uranium surplus that has kept prices below U.S. producer costs, regulatory pressures and a shrinking U.S. nuclear construction program.

"In a free world market," George E. Glasier, vice president of uranium marketing for Energy Fuels Nuclear Inc., said in a speech to the conference, most of today's current U.S. production capability "is noncompetitive and unnecessary to supply the free world's demand." And the prospects that U.S. producers can recapture their lost markets is strongly in doubt, Glasier said, because supplies from producers that can "produce into the competitive uranium market of the present... will be sufficient to supply the uranium needs of the world for the next ten to fifteen years."

DOE's Energy Information Administration reported recently that U.S. uranium production declined to 10,600 tons U308, the lowest since 1965 (Nucleonics Week, 7 June, 10), and uranium imports are expected to reach a peak of 47.6% of U.S. utility requirements by 1987.

Much of the damage suffered by U.S. producers is simply an accident of geology, according to conference participants. Glasier noted, for example, that "uranium ore reserves in the U.S. are primarily low grade in terms of quality and high cost in terms of production capability" while other countries such as Canada, South Africa and Australia have low-cost, high-grade supplies of uranium ore. According to Glasier, "the only (U.S.) producers securing new long-term commitments are those producers with the ability to produce for less than $30 per pound in current dollars. The U.S. producer with production costs in excess of $30 has been unable to compete for the available long-term contracts and for the most part has not attempted to compete in today's market."

Glasier said there currently are less than ten conventional mining and milling facilities in the U.S., and he expects that another two or three U.S. producers will cease operations this year. Unless "there is a significant recovery in the price of uranium in the next few years," Glasier said, "it is questionable that these facilities will ever be able to resume operations." Among the key signs pointing to the decline in the U.S. uranium producing community, Glasier said, are reduced spending for capital expenditures and for exploration and drilling. "Capital expenditures have declined from $500-million in 1980 to $36-million in 1983. Exploration and de-

Ontario Hydro

1983 ANNUAL REPORT

Fuel Supply Activities

FUELS DIVISION

FUELS DIVISION

1983 Annual Report

Fuel Supply Activities

OOOH SERIES 2.8.2
VOLUME 12.A.6
TITLE: 1983 Annual Report
Fuel Supply Activities

APRIL 1984

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1.0 INTRODUCTION

This report details the business activities of the Fuels Division during 1983 with comparative data for 1982. It provides data on primary fuel purchases, contract activity, investments in uranium facilities at Elliot Lake and other activities related to fuel supply. The report is structured to provide a brief review of the above in Sections 2.0 through 6.0. Detailed reports on coal and nuclear supply are provided in Appendices A and B.

2.0 OVERVIEW

Primary fuel purchases in 1983 were $936.9 million (1982 - $1,054.6 million) comprised of coal purchases of $708.9 million (1982 - $896.6 million) and nuclear purchases of $228 million (1982 – $158 million). These expenditures were equivalent to 25% of Ontario Hydro's total revenue in 1983.

Fuel was purchased under 35 separate contracts covering mining, refining, manufacturing, transportation and quality control.

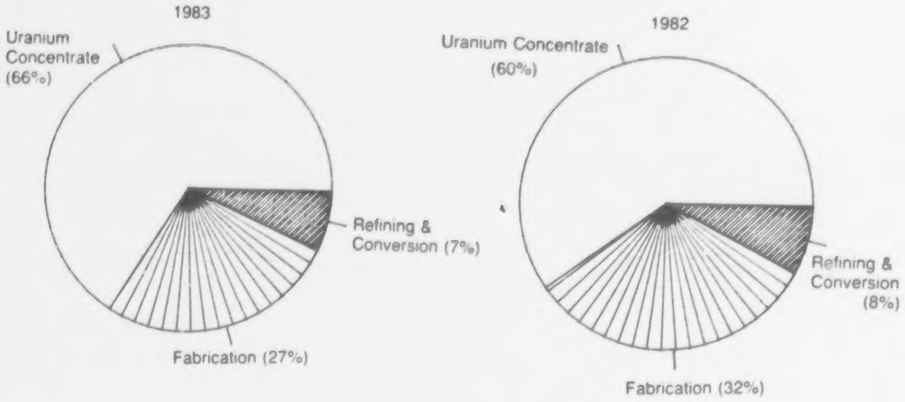
The following quantities were purchased:

	1983	1982
Coal (Tons)	11,322,200	14,825,900
Nuclear (Mg(U))		
Uranium Concentrates	1,250	1,000
Refining and Conversion Services	1,239	1,110
Fabrication Services	1,131	990

1,250 Mg(U)
2.6
3,250,000 lbs U_3O_8

To convert Mg(U) (million grams of elemental uranium) to pounds of U_3O_8 multiply Mg(U) by 2,579.8589 or simply 2.6

3.5 Nuclear Purchases by Component

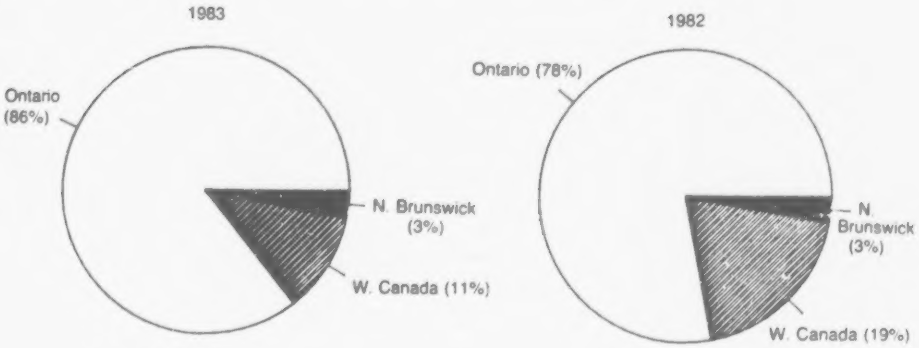


	$ Millions	
	1983	1982
Uranium Concentrate	151.0	95.0
Fabrication	61.5	51.0
Refining & Conversion	15.5	12.0
	288.0	158.0

- Uranium concentrate supply prices increased more rapidly than the prices of the other components due to the larger percentage of higher priced Elliot Lake uranium

$46.46 per pound
3,250,000 / 151,000,000
(lbs U_3O_8)

3.6 Nuclear Purchases by Point of Origin



NOTE:
All uranium is
purchased from
Canadian provinces

	$ Millions	
	1983	1982
Ontario	195.3	123.2
W. Canada	25.8	30.4
N. Brunswick	6.9	4.4
	228.0	158.0

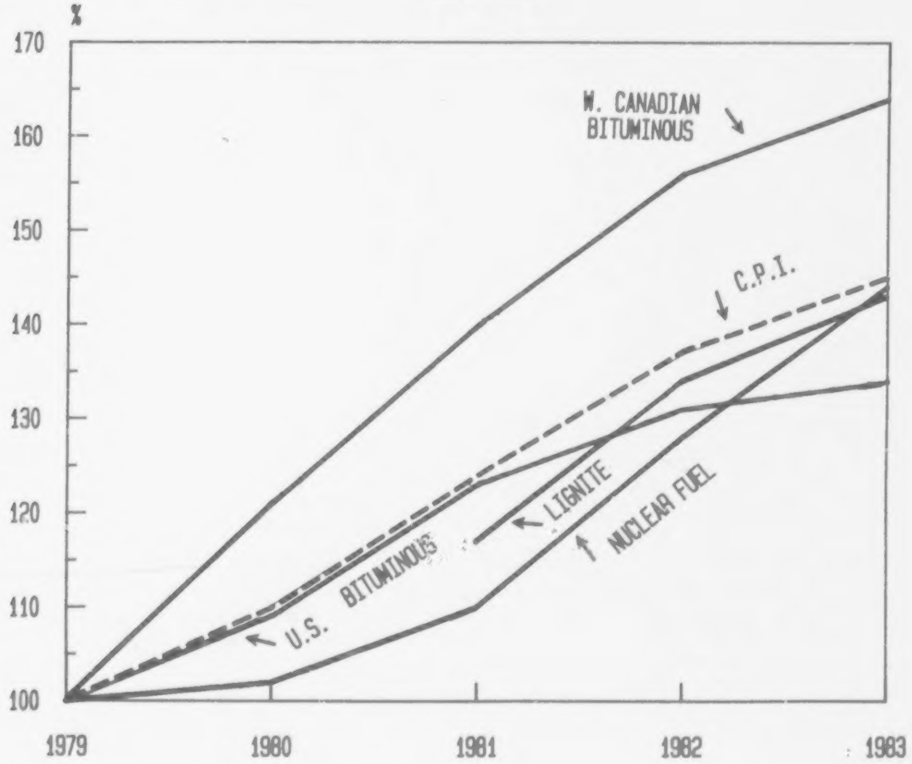
- Ontario purchases increased primarily due to increased concentrate purchases from Denison Mines and the start of production from the Rio Algom Stanleigh mine

4.0 FUEL PRICE TRENDS

Over the period 1979 to 1983 U.S. coal prices and lignite prices have escalated at a compound rate which is less than the rate of inflation. Nuclear fuel has escalated at a greater rate than inflation in the latter years such that by 1983 the compound growth rate was equal to the rate of inflation. Western Canadian bituminous coal prices increased rapidly in the early years primarily due to the influence of oil prices on rail transportation costs and large increases in mine labour rates.

FUEL PRICE TRENDS 1979 - 1983

1979 = 100



5.0 FUEL SUPPLY CONTRACT ACTIVITIES

1983 was a year of adjustment and consolidation. It was highlighted by the efforts required to meet the extreme variability of expected coal requirements throughout the year. Two nuclear fuel fabrication contracts were awarded in 1983 and one major contract amendment was negotiated. Surplus residual fuel oil and coal transportation equipment was disposed of during the year.

- The volatility in coal requirements had a profound effect on coal suppliers and transportation companies. In early 1983 a 20% reduction in contract coal deliveries was negotiated because of high inventory levels caused primarily by weak power demand and mild weather. By the summer, the economic recovery, nuclear outages, and warmer than average weather required the reinstatement of a significant portion of the earlier downsized quantities.
- An order for 100 Mg(U) of fuel for Bruce A and B was awarded to Combustion Engineering Superheater Ltd. for 1985 delivery.
- A contract for delivery of 25 Mg(U) of Douglas Point fuel was awarded to Westinghouse Canada Inc. but was later cancelled at AECL's request due to changed requirements.
- A reduction in mine development advances required under the Denison Mines Ltd. uranium concentrate contract was negotiated in recognition of the deferment of the Stanrock/Canmet development to 1990.
- Agreement was reached with Thunder Bay Terminals Limited on revenue sharing related to the Terminal's handling of non coal products.
- Sale of the remaining residual fuel oil inventory at Lennox GS was completed to coincide with the station mothballing schedule.
- A railway tank car lease arrangement, with Procor Ltd. was terminated in November.
- Five locomotives and one hundred rail cars, surplus to requirements due to improved cycle times between the mines and the Thunder Bay terminal, were sold to Canadian National Railways.

6.0 INVESTMENT IN FACILITIES

Ontario Hydro has contracted to fund the expansion of Dension Mine's processing capacity from 7100 tons of ore per day to 15,000 tons subject to a limit of $279.9 million in 1983 dollars.

At year-end advances totalled $279.5 million virtually at the limit. During 1983 the mine operated according to plan.

Ontario Hydro has contracted to fund the rehabilitation of Rio Algom's Stanleigh mine to establish a production capacity of approximately 2 million pounds of uranium oxide per year. Original project estimates were $371 million in 1983 dollars.

In 1983 Hydro advanced $87 million bringing its total to $351 million, $20 million under plan. Development of the project was completed during the year and production started in July. Start-up difficulties reduced 1983 production below expected levels.

FUELS DIVISION

1983 Nuclear Fuel Supply

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1.0 1983 Nuclear Fuel Supply

1.1 General

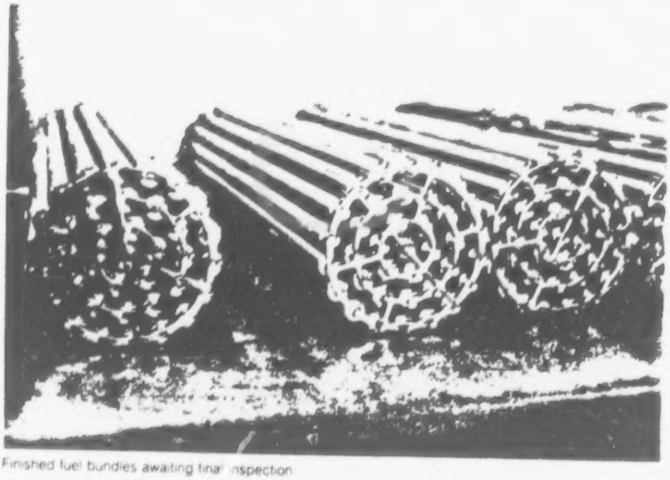
A total of 1130 Mg(U) of nuclear fuel was delivered for use at the nuclear generating stations during 1983. Expenditures for nuclear fuel during the year totalled approximately $228,000,000.

Table 1 shows a summary of deliveries and costs in 1983, with data for 1982 shown for comparison. Cost profiles are as noted on Figures 1 and 2 on the following page.

Throughout this report, all quantity and cost figures are rounded and approximate.

Table 1
Statistics Summary

	1983	1982
Quantities Purchased, Mg(U)		
Concentrate Supply Mg (U)	1,250	1,000
Refining Services	1,240	1,110
Fuel Bundle Manufacturing Services		
28 Element (Pickering)	450	450
37 Element (Bruce)	630	540
19 Element (Douglas Point)	50	—
Total	1,130	990
Cost of Above Purchases		
Total Cost ($ millions)	228	158



Finished fuel bundles awaiting final inspection

Figure 1
Bundle Component Costs, 1982-1983

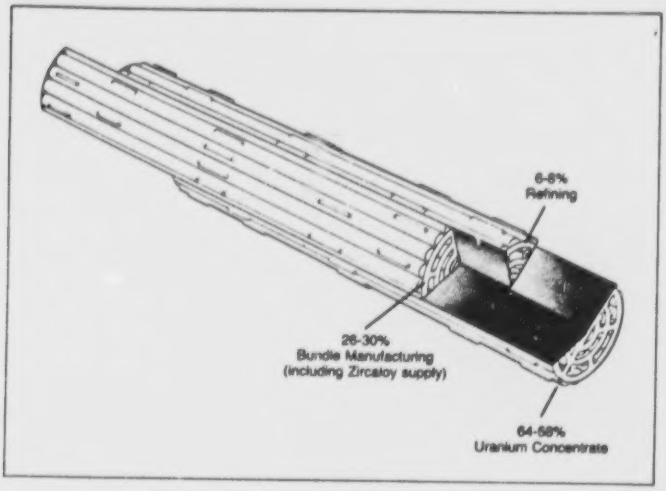
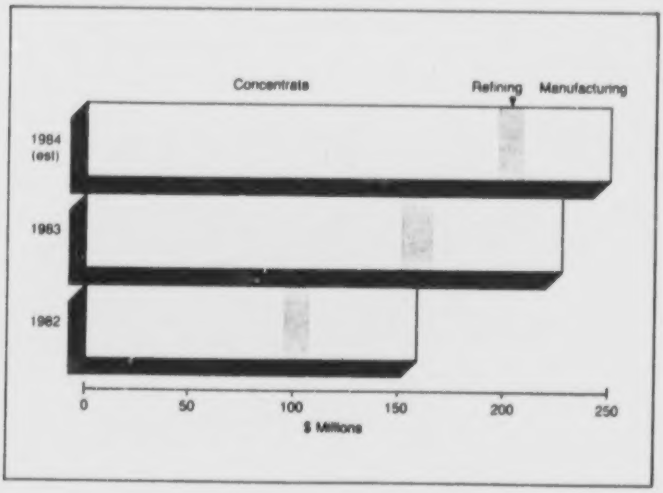

6-8%
Refining
26-30%
Bundle Manufacturing
(including Zircaloy supply)
64-68%
Uranium Concentrate

Figure 2
Nuclear Fuel Expenditures



2.0 Ontario Hydro Nuclear Fuel

2.1 General

The CANDU nuclear generating stations operated by Ontario Hydro require natural uranium, used in the form of uranium dioxide (UO_2) formed into high-density cylindrical pellets contained in Zircaloy sheaths 0.4 mm thick. The fuel elements (sheaths with their contained pellets) are assembled into bundles 495 mm long for fuelling the reactors. The bundles each contain 37 elements (for Bruce A and B), 28 elements (for Pickering A and B) or 19 elements (for Douglas Point).

All nuclear fuel quantities are expressed as kilograms (kg(U)) or megagrams (Mg(U)) of contained uranium, whether it exists in the form of mill concentrates, refined UO_2 or pellets in completed bundles.

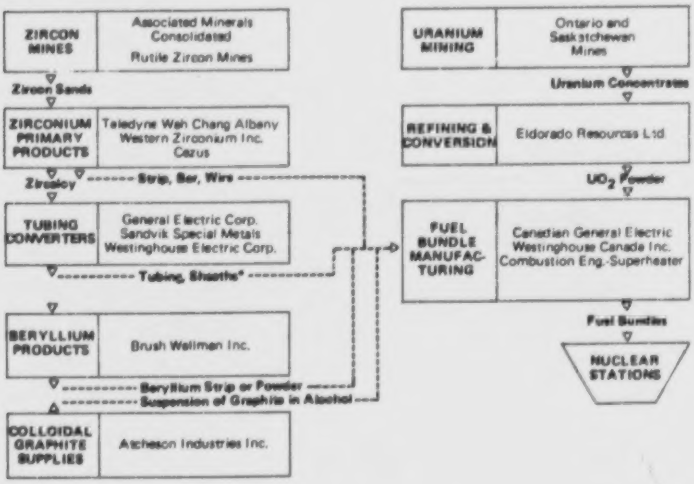
2.2 Materials Required

Materials required for nuclear fuel are:

- Uranium: for UO_2 pellet production.
- Zircaloy Mill Products: for production of sheaths, spacers, bearing pads and end plates, which are the structural components of the fuel bundles.
- Beryllium: Used for brazing the spacers and bearings pads to the sheaths.
- Graphite: Applied as a colloidal suspension in alcohol to the inner surfaces of those elements which will experience the most rigorous operating conditions.

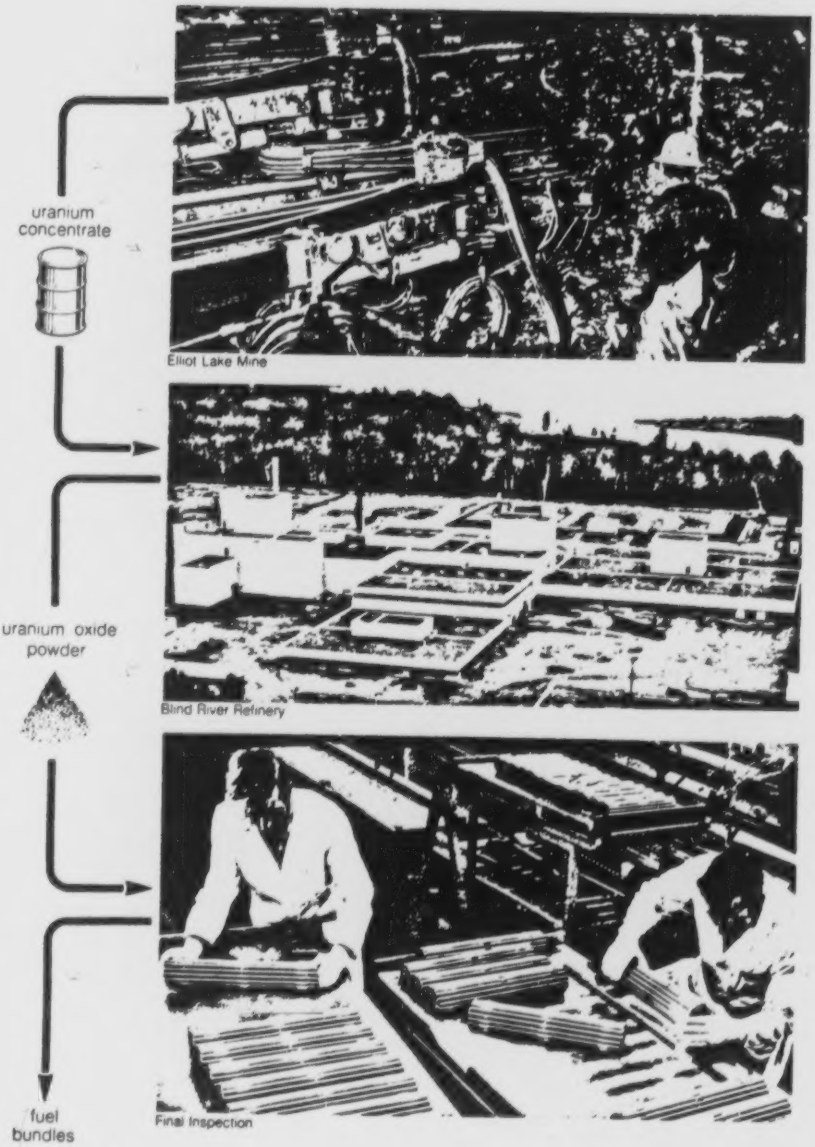
Figure 3

Nuclear Fuel Supply System


ZIRCON MINES
Associated Minerals Consolidated
Rutile Zircon Mines
Zircon Sands
ZIRCONIUM PRIMARY PRODUCTS
Teledyne Wah Chang Albany
Western Zirconium Inc.
Cezus
Zircaloy
Strip, Bar, Wire
TUBING CONVERTERS
General Electric Corp.
Sandvik Special Metals
Westinghouse Electric Corp.
Tubing, Sheaths*
BERYLLIUM PRODUCTS
Brush Wellman Inc.
Beryllium Strip or Powder
Suspension of Graphite in Alcohol
COLLOIDAL GRAPHITE SUPPLIES
Atcheson Industries Inc.
URANIUM MINING
Ontario and Saskatchewan Mines
Uranium Concentrates
REFINING & CONVERSION
Eldorado Resources Ltd.
UO2 Powder
FUEL BUNDLE MANUFACTURING
Canadian General Electric
Westinghouse Canada Inc.
Combustion Eng.-Superheater
Fuel Bundles
NUCLEAR STATIONS

* Finished sheaths are available to all three bundle manufacturers from the tubing converters shown. Canadian General Electric and Westinghouse Canada also provide sheaths from partially reduced tubing, for their own use and for sale to other manufacturers.

Figure 4
Pictorial Nuclear Fuel Supply Chain


uranium concentrate
uranium oxide powder
fuel bundles

Elliot Lake Mine

Blind River Refinery

Final Inspection

3.0 Nuclear Fuel Supply Industry Overview

3.1 General

The structure of the industry which supports the supply of nuclear fuel to Ontario Hydro is shown in Figure 3. Ontario Hydro's direct procurement activities are illustrated in Figure 4 and include

- Purchase of uranium mill concentrates (sometimes called "yellowcake"), mined and milled from uranium bearing ore and delivered by Ontario Hydro to the refiner.
- Purchase of services to refine the concentrates and to convert the refined uranium to a ceramic-grade UO_2 powder for use by the bundle manufacturers for pellet production.
- Purchase of manufacturing services to press and sinter the UO_2 powder into pellets, load the pellets into Zircaloy sheaths and assemble the finished fuel bundles.

Supplies of all Zircaloy products, beryllium and graphite are arranged by the bundle manufacturers, who include the costs of these materials in their prices.

Over 90% of the value of finished fuel bundles is of Canadian origin.

3.2 Concentrate Sources

Uranium concentrates are traded in world markets between many sellers and buyers and are the starting materials for all nuclear fuel produced in the world. Deliveries can be arranged under one-time "spot" purchases or through long-term contractual arrangements.

3.3 Refining Sources

There are five uranium refineries in the western world (one in Canada, two in the United States, and two in Europe). However, all but the Canadian refinery of Eldorado Resources Limited feed all of their refined product directly into uranium hexafluoride (UF_6) conversion plants which serve the light water reactor fuel industry, and only three of the foreign refineries are capable of producing (with modifications) a refined product of potential use for conversion to UO_2 for Ontario Hydro without going through the UF_6 stage. The Eldorado refinery is the only one which is designed to supply a conversion plant for production of the natural UO_2 which Ontario Hydro requires.

3.4 Conversion and Manufacturing Sources

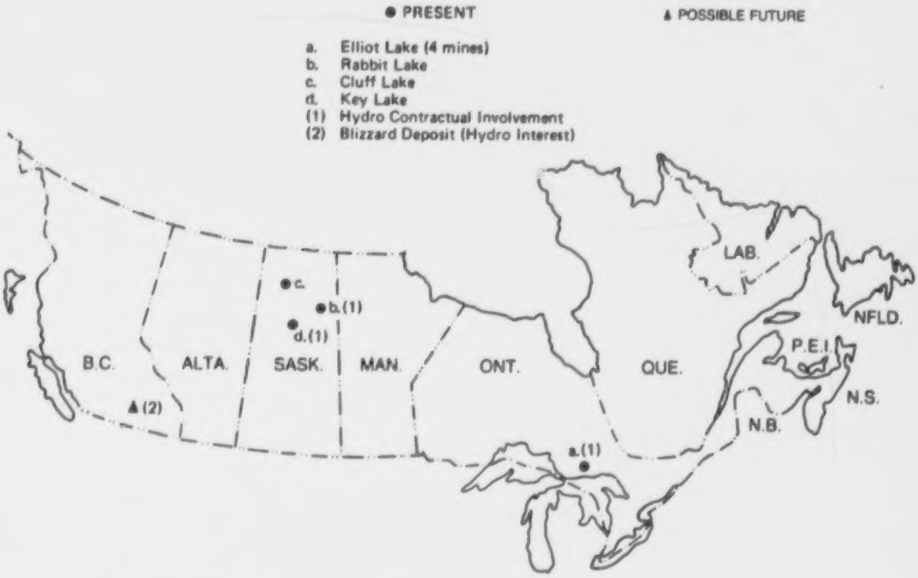
The UO_2 conversion plant and the bundle manufacturing plants shown in Figure 3 are the only facilities capable of providing these essential services to Ontario Hydro, and Ontario Hydro purchases over 80% of their production. As a result there is a close mutual dependency which must be taken into account in the contractual and business relationships. Exacting but even-handed monitoring of these largely captive industries is coordinated by Fuels Division with engineering support from Nuclear Generation Division and quality assurance surveillance support from Supply Division.

4.0 Uranium Concentrate Procurement and Exploration

4.1 General

Ontario Hydro has arranged for its requirements of uranium concentrates to beyond the end of the century under long-term contracts with Canadian producers. Figure 5 shows the locations of Canadian uranium mines operating in 1983, indicating those which provide long-term supplies to Ontario Hydro. The location of a potential future mine in which Ontario Hydro has an interest is also shown.

Figure 5
Uranium Mines in Canada


● PRESENT
▲ POSSIBLE FUTURE
a. Elliot Lake (4 mines)
b. Rabbit Lake
c. Cluff Lake
d. Key Lake
(1) Hydro Contractual Involvement
(2) Blizzard Deposit (Hydro Interest)
B.C.
ALTA.
SASK.
MAN.
ONT.
QUE.
LAB.
NFLD.
P.E.I.
N.S.
N.B.
c.
b.(1)
d.(1)
a.(1)
▲(2)

4.2 1983 Deliveries

The sourcing of Ontario Hydro's deliveries during 1983 (with 1982 shown for comparison purposes) is displayed in Table 2.

Table 2
Concentrate Deliveries Mg(U)

	1983	1982
Source		
Bancroft	—	20
Elliot Lake	980	710
Saskatchewan	270	270
Total Deliveries	1,250	1,000

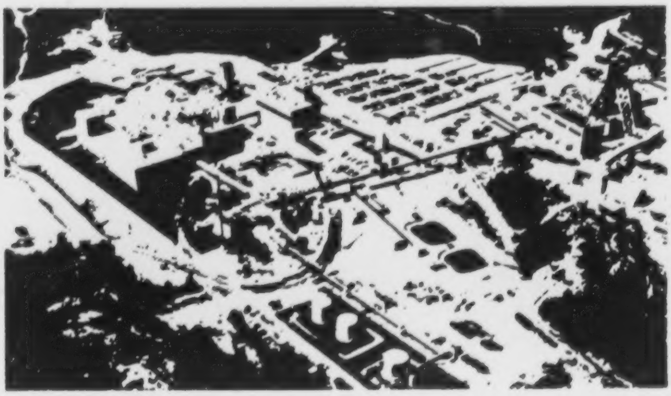
4.3 Elliot Lake Contracts

Two major contracts with Rio Algom Limited and Denison Mines Limited were signed in 1978. These contracts both require Ontario Hydro to advance capital funds for mine construction projects, with the advances to be repaid as credits against the cost of deliveries.

The Denison contract involves an approximate doubling of Denison's 1977 capacity. At the end of 1983 the project was over 90% complete, and the expanded mill was in operation. Deliveries to Ontario Hydro under the contract started as planned in 1980, remained on schedule through 1983, and are scheduled to continue through 2012.

The Rio Algom long-term contract involves the reconstruction and reopening of their Stanleigh Mine (closed since 1960). All production from the orebody (estimated at 28,460 Mg(U) is dedicated to Ontario Hydro, except for 500 Mg(U) which Rio Algom supplied in 1980 and 1981 from its other Elliot Lake mines as advance deliveries and which will be returned out of early Stanleigh production in the 1984-1986 period.

The Stanleigh Mine commenced production on schedule in July, 1983, and production is expected to continue to about 2020.



4.4 Other Long-Term Contracts

Deliveries under a contract with Rio Algom Limited for supply from its Quirke and Panel Mines at Elliot Lake were complete at the end of 1983.

Deliveries under a contract with Eldorado Resources Limited (formerly Gulf Minerals Canada Limited) for supply from its Rabbit Lake Mine in northern Saskatchewan will continue through 1985.

Deliveries under contracts with Eldorado Nuclear Limited and Uranerz Mining and Exploration Limited for supply from the Key Lake Mine in northern Saskatchewan are scheduled to begin in 1985 and to continue through 1993. The Key Lake Mine commenced production in 1983.

4.5 Long-Term Supply Status

Ontario Hydro has sufficient uranium under contract from Canadian producers to provide its forecast requirements for committed nuclear stations until about 2011. Table 3 shows contracts in place as of the end of 1983.

Table 3
Uranium Supply Contracts Mg(U)

	Delivery Period	Total Quantities	Deliveries (Post 1983)	Pounds U_3O_8
Elliot Lake				
Rio Algom (Stanleigh)	1983-2020	28,480	27,810	72,302,076
Denison Mines	1980-2012	44,200	43,700	113,613,934
Saskatchewan				
Eldorado Resources (Rabbit Lake)	1980-1985	1,420	460	1,195,936
Eldorado Nuclear (Key Lake)	1985-1993	2,080	2,080	5,407,707
Uranerz (Key Lake)	1985-1993	3,120	3,120	8,111,560
Total		79,290	77,170	200,631,192

4.6 Exploration for Uranium

Due to budgetary constraints and other considerations, Ontario Hydro involvement in uranium exploration field work in 1983 was limited to participation in a joint venture with Amok Ltd. and Saskatchewan Mining Development Corporation (SMDC) on a property adjacent to the Cluff Lake Mine of Amok in Saskatchewan. Funds for this work were provided by SMDC under the terms of an agreement made in 1980 by which SMDC purchased a one-third interest in the venture.

One result of Ontario Hydro's past participation in uranium exploration was the acquisition of a 13.5% share in the Blizzard deposit near Kelowna, British Columbia. If brought to production (not possible at present due to a moratorium on uranium developments in that province) the Blizzard mine could provide about 500 Mg(U) to Ontario Hydro at cost and return a profit on Ontario Hydro's total investments in uranium exploration.

5.0 Procurement of Uranium Refining and UO_2 Conversion Services

5.1 General

Concentrates purchased by Ontario Hydro are shipped to the uranium refining facilities of Eldorado Resources Limited (a subsidiary of Eldorado Nuclear Limited) at Blind River, Ontario, which were completed in 1983. Eldorado refines the concentrates to a uranium trioxide (UO_3) intermediate product which is then shipped to Eldorado's conversion facilities at Port Hope, Ontario where it is converted to ceramic-grade uranium dioxide (UO_2) powder. The UO_2 is then provided free issue to the bundle manufacturers. Scrap UO_2 from the bundle manufacturing plants is also returned to Eldorado for reprocessing and re-use. All of these services are provided under a contract extending to the end of 1991.

About 20% of the output of the Blind River refinery is converted to UO_2 for Ontario Hydro and other users of Candu reactors. The balance is converted at Port Hope to uranium hexafluoride for export.

Eldorado produces the UO_2 in lots of about 5 Mg(U) certified as to basic physical and chemical specification requirements. Since the specification requirements will not in themselves guarantee satisfactory performance of the UO_2 for pellet production, final acceptance by Ontario Hydro is based on testing of a sample from each lot by a bundle manufacturer.

5.2 1983 Deliveries

Table 4 shows UO_2 deliveries in 1983, with 1982 deliveries shown for comparison purposes.

Table 4
Uranium Refining and Conversion Services

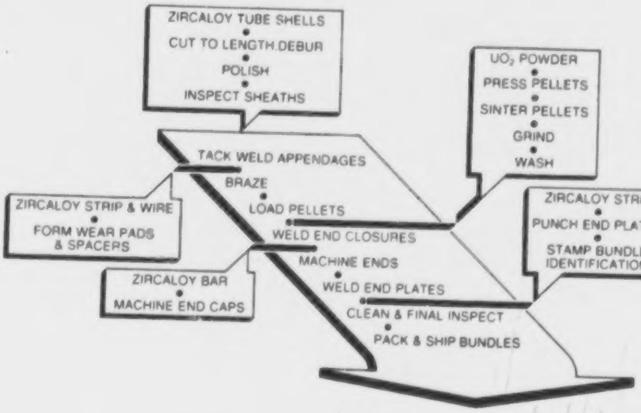
	1983	1982
From Concentrates	1,160	980
From Reprocessed Scrap	80	130
Total UO_2 Deliveries	1,240	1,110

6.0 Procurement of Bundle Manufacturing Services

6.1 General

Nuclear fuel bundles are precise assemblies, with stringent specifications. They are produced by production lines which employ modern, tightly-controlled mass-production methods. A condensed flowsheet of the manufacturing process is shown in Figure 6.

Figure 6
Condensed Manufacturing Process Flow Sheet – Fuel Bundles


ZIRCALOY TUBE SHELLS
CUT TO LENGTH,DEBUR
POLISH
INSPECT SHEATHS
UO_2 POWDER
PRESS PELLETS
SINTER PELLETS
GRIND
WASH
TACK WELD APPENDAGES
BRAZE
LOAD PELLETS
WELD END CLOSURES
MACHINE ENDS
WELD END PLATES
CLEAN & FINAL INSPECT
PACK & SHIP BUNDLES
ZIRCALOY STRIP & WIRE
FORM WEAR PADS & SPACERS
ZIRCALOY BAR
MACHINE END CAPS
ZIRCALOY STRIP
PUNCH END PLATES
STAMP BUNDLE IDENTIFICATION

6.1 General (Cont.)

During 1983, the 1,130 Mg(U) delivered represented some 60,000 bundles, which contained 54 million UO_2 pellets contained in 1.9 million Zircaloy sheaths. Over 10.9 million brazed joints and 7.7 million welded joints were required in the assembly of these bundles from about 16.1 million separate Zircaloy parts.

While a defect in any pellet, part or joint can lead to failure in service, to date no failures have been traced to faulty pellets or brazed joints. If all failures attributable to manufacturing defects for which another cause cannot be established are assumed to be due to defects in the most critical end closure welds (one-half of the total welds) service experience suggest a defect rate of ten welds per million produced.

This quality level cannot be demonstrated or monitored by normal inspection methods, and is achieved by the suppliers through the careful qualification and control of each production operation, under surveillance by Ontario Hydro's experienced nuclear fuel inspectors.

The contracts for bundle manufacturing require the suppliers to reimburse Ontario Hydro for extra reprocessing costs or inventory carrying costs resulting from the production of UO_2 scrap or the holding of UO_2 inventories beyond contractual limits. These provisions ensure that Ontario Hydro's free issue UO_2 is utilized effectively for bundle production.

6.2 The Bundle Manufacturing Industry

Fuel bundle manufacturing services are provided by Canadian General Electric Co. Ltd. (CGE), Westinghouse Canada Inc. (WCI) and Combustion Engineering-Superheater Ltd. (CE-S). CGE's pellet production plant is in Toronto, and its assembly plant is in Peterborough. WCI has a plant at Port Hope, with an assembly branch plant at Varennes, Quebec. The CE-S plant is located at Moncton, New Brunswick.

Zircaloy fuel sheaths are supplied by CGE at Arnprior, by WCI at Cobourg, and to a limited extent by suppliers in Europe and the United States. Tube hollows for the production of sheaths, as well as Zircaloy strip, wire and bar for production of other component parts, are imported from Europe or the United States.

6.3 Bundle Manufacturing Procurement Strategy

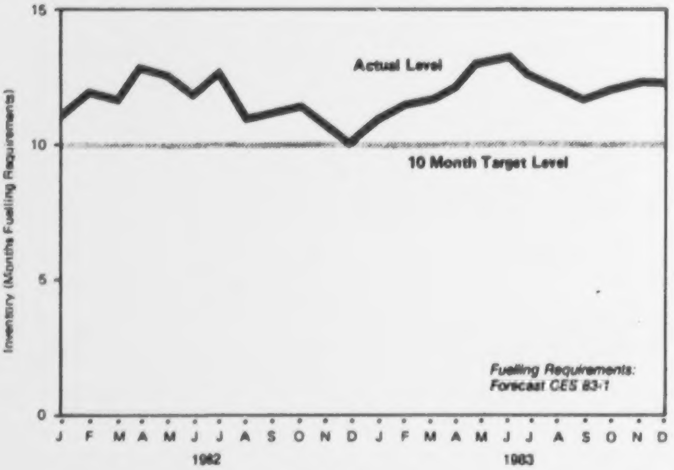
Base quantities of about two-thirds of projected bundle manufacturing requirements for the Pickering and Bruce stations are contracted two to four years in advance to ensure secure sourcing and to provide the industry with a basis for production and capacity planning to serve Ontario Hydro's ongoing needs. Supplemental quantities are placed each year to adjust deliveries in the following year to the rate required to maintain the bundle inventories at the levels needed to protect the stations against supply interruptions.

The much smaller Douglas Point requirements are ordered year by year as required. Although Atomic Energy Energy of Canada Limited (AECL) owns the Douglas Point station, Ontario Hydro purchases the fuel which is required.

6.4 Bruce and Pickering Bundle Inventories

Deliveries of Bruce and Pickering bundles are planned so as to maintain inventories equal to a target level of 10 months' forecast fuelling requirements. the quantities of fuel required for this purpose at any time vary according to the forecast requirements. Figure 7 shows the actual total inventories during 1982 and 1983 as compared to the target level, based on the requirements as forecasted in 1983. Inventories have been above target, due mainly to deferments in construction schedules for new nuclear stations.

Figure 7
Fuel Bundle Inventory Position, 1982-1983



6.5 1983 Procurement Actions

During 1983, a supplemental order for 100 Mg(U) of fuel for Bruce A and B was awarded to CE-S for 1985 delivery. A contract for delivery of 25 Mg(U) of Douglas Point fuel was awarded to WCI, but was later cancelled at AECL's request prior to completion.

6.6 Contract Status

Table 5 shows deliveries in 1983 as well as those under contract as of the end of 1983 Deliveries in 1982 are also shown for reference purposes

Table 5
Nuclear Fuel Bundle Manufacturing Quantities Mg(U)

Generating Station	Bruce	Pickering	Douglas Point
1982 Deliveries	540	450	—
1983 Deliveries	630	450	50
1984 - Under Contract	580	290	—
1985 - Under Contract	600	350	—
1986 - Under Contract	500	350	—

7.0 Nuclear Fuel Supply Security

During 1983 individual studies on the supply of concentrates, zirconium alloys and refining/conversion services were revised as part of a continuing review of the security of the nuclear fuel supply cycle. The refining/conversion study formed the basis for an OEB submission on Target Fuel Inventory Levels

- Security of supply of uranium concentrates is satisfactory, being secured by long-term contracts with Canadian mines for major quantities and backed up by expanding domestic production capability, favourable government policies and excess inventories in Canada and elsewhere
- The supply of refining/conversion services has received particular attention as the key factor affecting the overall security of the nuclear fuel cycle and fuel inventory target levels Eldorado Resources Limited is the sole source for these services at present Alternatives for supply backup have been identified and are currently being evaluated
- With the current practise regarding bundle inventories, and with the continued availability of at least two viable sources of supply security of supply of fuel bundle manufacturing services is considered to be satisfactory through 1986 The balanced orderly development of the industry beyond 1986 is a matter that will require close monitoring
- The sourcing of Zircaloy mill products by the bundle manufacturers provides for balanced diversified supply, based on two zirconium producers in the U S and one in France all with surplus capacity Security of supply of these products is considered to be satisfactory

LONG-TERM FUEL AGREEMENTS

Ontario Hydro currently has 35 major fuel supply contracts outstanding with a 1983 dollar value of approximately $15.3 billion covering fuel purchases out to the year 2020. Minimum contract quantities have been used to estimate dollar values outstanding.

Supplier	Estimated Outstanding Value ($ Million-1983 Constant Dollars)	Agreement Expiry Date
NUCLEAR FUEL SUPPLY		
Uranium Concentrate	9,377	
Eldorado Nuclear Limited		1993
Denison Mines Ltd.		2012
Rio Algom Ltd.		2020
Uranerz Exploration & Mining Limited		1993
Uranium Refining	167	
Eldorado Nuclear Ltd.		1991
Nuclear Fuel Manufacturing	102	
Canadian General Electric Co. Ltd.		1986
Combustion Engineering Superheater Ltd.		1985
Westinghouse Canada Inc.		1986
Total Nuclear Fuel Supply	9,646	
U.S. COAL SUPPLY		
U.S. Coal	3,497	
United States Steel Corp.		2007
Consolidation Coal Co. Inc.		1986
Consol Pennsylvania Coal Co.		1991
Eastern Associated Coal Corp.		1989
Coal Associates Inc.		1985
Oneida Coal Co. Inc.		1984
ANR Coal Sales Inc.		1985
Rail Transportation and Storage	116	
Consolidated Rail Corp.		1987
Baltimore and Ohio Railroad		1985
Bessemer & Lake Erie		1984
Pittsburgh and Lake Erie Railroad		1984
Procor Ltd.		1990
General American Transportation Corp.		1986
Greenlease Co.		1990
Testing	6	
Commercial Testing & Engineering Company		1988
Vessel Transportation	82	
Upper Lakes Shipping Ltd.		1991
Canada Steamship Lines Inc.		1991
Algoma Central Railway		1991
Total U.S. Coal Supply	3,701	

Supplier	Estimated Outstanding Value ($ Million-1983 Constant Dollars)	Agreement Expiry Date
WESTERN CANADIAN COAL SUPPLY		
Western Canadian Coal & Lignite	1,068	
Luscar Coal Co. Ltd. (Bituminous)		1992
Byron Creek Collieries Ltd. (Bituminous)		1992
Luscar Coal Co. Ltd. (Lignite)		1996
Rail Transportation and Terminalling	981	
Canadian National Railway		1992
Canadian Pacific Ltd. (Lignite)		1994
Canadian Pacific Ltd. (Bituminous)		1994
Thunder Bay Terminals Ltd.		1993
Vessel Transportation	134	
Upper Lakes Shipping Ltd.		1993
Algoma Central Railway		1993
Total Western Canadian Coal Supply	2,183	
Total Coal Supply	5,884	
Total Nuclear and Coal Supply	15,530	

NuclearFuel

A biweekly report from the editors of Nucleonics Week

Special Issue – March 9, 1981

EXTRA

GIFT OF STOCKPILE TO ELDORADO SHAKES INDUSTRY

"It's logical to be concerned in an oversupplied market when what was perceived to be a firmly held government stockpile is shifted into the hands of an active producer and seller. That's the only conclusion you can draw out of it. It's got to be a worry to everybody in the uranium selling business internationally; with surpluses kicking around right now – mainly in utility hands – this could be perceived to be an additional overhang of available material in the marketplace," said one Canadian uranium producer of his government's proposal to trade its 5,570-tonne stockpile of uranium concentrates to Eldorado Nuclear for (Cdn)$300-million of Eldorado stock.

The March 4 move was accompanied by another proposal to Parliament – to increase Eldorado's debt limit from $130-million to $280-million. An increase in the amount of debt the crown corporation may amass won't get Eldorado a loan, however. So the stockpile would be thrown in to increase Eldorado's debt-to-equity ratio and its borrowing power. Eldorado debt to equity was 1.6 in 1978, 1.9 in 1979 and 2.5 in 1980. Aim is a ratio of 0.4-0.6; company officials won't say just where the "large infusion of equity" represented by the stockpile puts that ratio.

That increase in borrowing limit won't be enough for very long. The extra $150-million "will not provide the capital required in the next three or four years; in fact we'll probably need double that," said an Eldorado official. He could not be precise about future borrowing, however, because "it depends somewhat on the market and on what internally generated cash flow we have." That borrowing is to finance an ambitious expansion in uranium refining, and one Eldorado official sees that expansion as a matter of life and death. "If we have to exempt (Elliot Lake and Saskatchewan uranium) from processing and export it as raw yellowcake, the whole question of further processing policy in Canada, I think, goes down the drain."

The value of the stockpile is put by government sources at (Cdn) $76-million, but an Eldorado source says that is in 1960 dollars, so the present value is really around $300-million. How its transfer would affect the world uranium market is equally unclear; Eldorado officials pledge caution, but $200-million of the stock going to the government is preferred and carries an obligation for the company to pay a 10% return each year.

So while government finance people are describing it as simply "a bookkeeping exercise," a senior Eldorado Nuclear official says the acquisition of the stockpile does give the corporation a free hand in its disposal. "It is available for sale, so it isn't a question of trusting Eldorado not to release it," the official said.

"It is, however, totally contrary to our own interests to be out there screwing around," he said, citing the fact that Eldorado's Beaverlodge property in northern Saskatchewan is one of the highest-cost producing mines in the world. "We're not the ones who have been out there lowballing bids on the marketplace." The stockpile has been "available in any case. So, in one sense, not a hell of a lot has changed," he said. He also promised it would be used for "the greater benefit of Eldorado Nuclear Ltd. and Canada," keeping in mind "the concern about the current poor market conditions which we would not want to exacerbate in the near term."

Another Canadian producer didn't "understand why this move was made at this time. My perception of the stockpile is that it was a backup for Canadian producers." It will continue to be one, according to an Eldorado source. Canadian producers had been permitted to borrow from the pile at rates tied to the prime. The only outstanding loan is to Eldor, an Eldorado subsidiary, he said, which borrowed 2.5-million pounds at 9.125% in 1978 and sold it at spot prices to finance its investment in Elliot Lake. With regard to further borrowing, "We would certainly make it available to producers who perhaps run into trouble, such as a fire in a mill or something. We will certainly be very receptive."

Another Eldorado source reiterated that the company, notwithstanding concerns voiced elsewhere, will manage the stockpile responsibly. "We're not going to firesale the stuff . . . but it will be marketed in Canada and abroad over a period of years as . . . opportunities arise. (But) we will act with due caution."

An energy department spokesman said the government would simply have to "trust" Eldorado to use the stockpile wisely. He said a telex had gone out to all producers advising them of the transfer, the explanation being that "the overall objective is to put Eldorado Nuclear's debt-equity structure on a more stable footing." He said Eldorado is obliged to disperse

NuclearFuel

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NOTED
AUG 28 1984
J. R. S.

HIGHLIGHTS

AEP and Philadelphia Electric ask bids for 2-million pounds U – *page 2*

TVA considers Duke Power offer to sell electricity to Oak Ridge – *page 2*

REA cask picked as third cask choice by VEPCO for storage demo – *page 3*

EIA ISSUES 1983 URANIUM MARKET SURVEY – *page 7*

Interim report on adequacy of waste fees prompts little industry reaction – *page 8*

Argentina cuts back reprocessing to plan but enrichment to continue – *page 9*

GAO plans to audit DOE enrichment finances – *page 10*

. . . while congressional staff and law firm are refused copies of signed US contracts – *page 11*

Single repository for defense and commercial waste urged in study – *page 11*

BNFL profits are up – *page 12*

Senate hearing planned on state of domestic uranium industry – *page 13*

DOE nuclear chief resigns – *page 14*

HODEL WARNS U.S. UTILITIES OF RISKS IN SIGNING FOREIGN SWU CONTRACTS

Energy Secretary Donald Hodel has sent letters to the chief executive officers of 18 U.S. utilities warning them of risks associated with signing enrichment contracts with non-U.S. suppliers, NuclearFuel has learned. Among the risks mentioned by Hodel is the possibility that DOE will be successful in challenging what it believes are the "anticompetitive" practices of at least one supplier—COGEMA, Inc.

John Longenecker, deputy assistant secretary for uranium enrichment, confirmed that Hodel has told him to pursue possible trade actions against COGEMA, Inc. to some "definitive conclusion." Sources say that DOE is focusing its attention on preparing antidumping petitions to submit to the U.S. Commerce Department and the International Trade Commission (ITC). But, the sources say, DOE is also considering asking Congress for some special trade protection legislation.

The 18 utilities contacted by Hodel are those that have not engaged in any serious discussion with DOE about converting to the new utility services enrichment contract, sources say.

According to sources, DOE became alarmed after learning of the offers COGEMA, Inc. had submitted to Vermont Yankee Nuclear Power Corp., Maine Yankee Atomic Power Corp., and the Yankee Atomic Electric Co. The sources say that DOE believes the offers included a flat 30% discount off whatever price DOE will charge for SWU. COGEMA, Inc. is believed to have made similar offers (although the discounts are different) to other U.S. utilities, including Consolidated Edison and the Public Service Electric & Gas Co.

In general, say lawyers who are knowledgeable about antidumping cases, a petitioner has a case if he can present evidence that foreign sales in the U.S. are made at prices below those in the foreign company's home market.

FLORIDA POWER & LIGHT TO BUY SMDC'S U308

Saskatchewan Mining Development Corp. (SMDC) apparently is continuing its aggressive marketing of uranium to U.S. utilities with the latest sale of U308 said to be destined for the Florida Power & Light Co. The utility went out for bids for 700,000 pounds of U308 in late June, and, informed sources say, FP&L signed letters of intent within the past three weeks to buy at least 500,000 lb of that quantity from SMDC. Other sources said

FP&L apparently has agreed to purchase all 700,000 lb from SMDC. FP&L would neither confirm nor deny a purchase of SMDC material. The sale price is said to be near recent spot market prices of between $17.50 and $18.25/lb.

The sale is believed to be the fourth by SMDC to a U.S utility since June. Those recent sales include ones to Philadelphia Electric (NF, 4 June, 1), Virginia Electric & Power Co., and Nebraska Public Power District (NF, 2 July, 2). Some sources suggest SMDC's recent sales of U308 in the U.S. have been aided by a relaxation in the Canadian government's requirement that uranium be converted to UF6 before it is exported. Sources in both Canada and the U.S. say Canada's Uranium Export Review panel, which must approve all foreign sales, has increasingly been willing to grant exemptions and allow U308 exports to the U.S. if a utility already has an existing conversion contract with a U.S. converter. Such exemptions, the sources say, allow Canadian mining companies to compete for U.S. spot market business.

—Michael Ganley, New York

TVA MULLS PLAN TO WHEEL ELECTRICITY FROM DUKE POWER TO OAK RIDGE

William Lee, the chairman and chief executive officer of Duke Power Co., announced that Duke is willing to sell up to 600 megawatts (MW) of its excess power to DOE to run the Oak Ridge gaseous diffusion plant. According to a top DOE official, the Duke proposal says that the power would be available for 40% of the time at a price not to exceed 19 mills. The official said the power might be enough to totally displace the power now supplied by the Tennessee Valley Authority to the Oak Ridge plant. He added that a preliminary estimate indicates DOE might save from $25- to $50-million by displacing the TVA power with power from Duke.

Lee, who is heading up an enrichment advisory panel established by three congressional committees, made his announcement in Washington August 16 at the first meeting of the panel.

DOE currently pays TVA 34.53-mills per kilowatt-hour (KWH), including a demand charge calculated to be 9.77-mills/KWH. DOE has to pay the demand charge for all power that it is under contract to take from TVA even if it does not use that power. At present, DOE is buying about 650 MW from TVA, but is under contract to take 4,485 MW.

Separately, DOE announced that it had signed another agreement with the Ohio Valley Electric Cooperative (OVEC) to purchase excess power that OVEC has available on weekends. The power, costing 18 mills, will be used to run DOE's gaseous diffusion plant at Portsmouth, Ohio. A DOE official said that more than 50% of DOE's enriching is now being done at the Portsmouth plant.

TVA sources said the agency has received DOE's proposal for allowing Duke to wheel power through the federal utility system to Oak Ridge and "is doing an evaluation of it." One source said there are major technical obstacles to wheeling the power because of the lack of direct interconnections with Duke. The source allowed, however, that TVA's evaluation also would include the political and policy implications of allowing DOE, which has a standard power sales contract with the agency similar to those signed by large industrial users, to contract with another power source.

TVA officials, who blame DOE's poor judgment calls on SWU demand for forcing the agency to order and then cancel at least one large nuclear reactor, have steadfastly refused to modify DOE's power sales agreement despite the pressure that DOE has tried to generate in Washington to do so. A TVA source said the Duke proposal was being viewed as yet one more attempt by DOE to put political pressure on it.

TVA said wheeling arrangements to get the power to Tennessee would probably have to be made with the American Electric Power system, the Southern Company, or possibly Carolina Power & Light. TVA said it had not set a timetable for responding to DOE's proposal.

AEP AND PHILADELPHIA ELECTRIC LOOKING FOR 2-MILLION POUNDS OF URANIUM

American Electric Power Co., is expected by September 1 to go out for bids for between 800,000 to 1-million pounds of uranium, either as U3O8 or as UF6, according to informed sources. The material would be for delivery in either December or January for Cook-1. The unit is operated by Indiana & Michigan Electric Co.

A second utility, Philadelphia Electric Co., also is seeking approximately 1.2-million lb for delivery from 1986 through 1992 under two separate bid calls.

Sources said AEP wants at least 800,000 lb for reload material, but also will consider offers "up to 1-million plus pounds" with the amount above 800,000 lb to be held for inventory. AEP is pursuing a strategy it has used in the past of covering its uranium needs through spot market purchases, although it is not opposed to considering a long-term supply contract if it is tied to spot market prices with a discount. A source said that every time AEP buys a reload it wants to save $10-million compared to the price it paid for its previous reload. AEP continues to meet much of its uranium demand through a 500,000 lb/yr contract with Energy Resources of Australia. The Cook-1 reload also will require the purchase of approximately 120,000 SWU on the spot market, according to an informed source.

Philadelphia Electric issued a call first for 150,000 lb U308 annually for delivery beginning in 1986 and extending through 1990. The second call is for 150,000 lb annually for delivery beginning in 1988 through 1992. The utility has existing contracts with Union Carbide, Uranerz, Phillips Uranium Corp., and the Saskatchewan Mining & Development Co. totalling about 1.4-million lb/yr for delivery through 1991. The utility's three reactors operate on an 18-month fuel cycle requiring roughly 700,000 lb per reload. Limerick-2, scheduled to go into commercial operation in 1988, would require another 400,000 lb/yr.*—Michael Ganley, New York*

TVA IS CONSIDERING VA. EXPLORATION AGREEMENT WITH MARLINE URANIUM CORP.

The Tennessee Valley Authority (TVA) is seriously considering a joint venture to explore for uranium on leases held by Marline Uranium Corp. in Pittsylvania County, Va., according to industry sources. The proposal under consideration is "very similiar—if not identical to—the joint venture with UMETCO (Union Carbide)," a source said. The proposal under consideration at TVA involves some of the properties on

This advisory body for the Agency of Natural Resources and Energy (Anre) is expected to try to quitely keep the idea afloat. The GEC and others have yet to begin debates on key details, however, such as who should stockpile and how stockpiling would be accomplished. An Anre official anticipated that the idea of stockpiling may move into a new phase of discussion soon. Until now, the idea has failed to become a "realistic" issue due to the lack in Japan of a commercial enrichment plant.

The utilities' plan for siting an enrichment plant at Shimokita peninsula (NF, 23 April, 7) may help revive interest in stockpiling, however, because, as some sources suggest, U308 can be stockpiled adjacent to the projected enriching plant.

While spot market prices for U308 are much lower than the prices agreed to by Japanese utilities, those utilities have traditionally paid more than spot prices in order to maintain good relations with long-term suppliers. The biggest drop in prices to Japanese utilities occurred between 1981—when utilities paid approximately $45/lb—and 1982—when prices were set between $37-$38.50/lb.

VEPCO AND NEBRASKA PUBLIC POWER BUY FROM CANADIAN PRODUCERS

Canadian producers continue to make inroads into the U.S. utility market with sales in recent weeks of approximately 800,000 pounds U308, according to informed sources.

The sources said Virginia Electric & Power Co. recently agreed to buy 500,000 lbs U308 from the Saskatchewan Mining Development Corp. for near-term delivery at current spot market prices of slightly over $18/lb. Vepco said recently it is getting less than 50% of its inventory needs through long-term contracts and that a minimum of 20% of its needs will come from spot market purchases (NF, 23 April, 5).

In a second deal, sources said Nebraska Public Power District has purchased 300,000 lbs U308 from Uranerzbergbau's Canadian subsidiary, Uranerz Exploration and Mining Ltd. The purchase price also is said to be slightly over $18/lb.

Official Canadian policy requires that uranium should be upgraded to UF6 before export. However, Canadian and other sources say that exemptions have been granted recently in a few "exceptional" cases involving small amounts of U308 and where the utility had an existing conversion contracts.

–Michael Ganley, New York

SOME IN DOE QUESTION NEED FOR MARGINAL COST SWU PRICE

At least some DOE officials are questioning the logic of offering a swu price based on DOE's marginal cost of production if DOE signs up most of its current customers for 100% of their requirements. But, says a department source, the idea of offering customers a second and lower price for 30% of their requirements has stirred so much interest among utilities, "I don't know how we can get out of doing it."

An alternative to offering two swu prices to utilities, he says, would be for DOE to just lower its primary price in the utility services (US) enrichment contract if revenues exceed current projections. But, he says, utilities seem to prefer the idea of having a two-tiered pricing structure.

The DOE source confirms that any offer to sell swu at a price based on DOE's marginal production cost would only be made to those who sign a US contract.

He also says that DOE is considering changing its enrichment criteria to protect DOE from any legal challenge to a two-tiered pricing structure and to give Congress a chance to react to the proposal.

PLUTONIUM SHIPMENT BETWEEN FRANCE AND JAPAN PLANNED FOR NEXT YEAR

The Reagan Administration is set to approve a long-delayed shipment of 105 kg of plutonium from France to Japan, sources said. The Pu was recovered from U.S.-origin fuel, and so the retransfer must be approved by the U.S. The Congress must be notified of the shipment, but unless it passes a law, it cannot prevent the shipment from occurring.

The shipment has been delayed for well over a year (NF, 4 July '83, 3) because of U.S. concerns over security arrangements for the transport. U.S. sources would not discuss details of the shipment. One source did say, however, that the security measures were extensive and costly. "Any terrorist should not even think about hijacking this shipment," he added.

Sources said the U.S. Department of Defense raised objections to the shipment—objections that were similar to ones raised by DOD in connection with the retransfer of U.S.-controlled Pu from France to Switzerland (NF, 30 Jan., 4). DOD is said to question, in general, whether Pu can be adequately safeguarded so as to assure the U.S. that it will receive timely warning of any diversion. Sources said that the State Department and other agencies prevailed within the Administration by arguing that the shipment to Japan was important for the maintenance of good relations with Japan.

It was unclear, however, whether the Administration will now approve the shipment of 200 kg of Pu to Switzerland.

Japanese government officials were reluctant to divulge details on Cogema's shipping of plutonium back to Japan on the grounds of physical protection for the 105 kg of material. But despite their reluctance, they provide clear indications that the first transocean plutonium transportation between France and Japan is firmly being planned—perhaps for next year.

The present plan calls for inserting the returned plutonium into "a certain reactor"—the 100-Mw "Joyo" experimental fast reactor of the government's Power Reactor and Nuclear Fuel Development Corp. (PNC) at its O-Arai engineering center, which is an open secret—sometime in 1986.

Officials refuse to reveal if the Science and Technology Agency (STA) has approved the plutonium casks that Cogema has proposed. "We regard this as a sensitive fact from the viewpoint of physical protection," says an STA source. Others reported that the casks are no longer a major problem, thus hinting that the STA has either approved or is about to approve Cogema's specs. The STA official declined to provide other details. Bound by the physical protection rules, he commented, "We see light at the end of the long

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NRC APPROVES NEW FEE SCHEDULE – *page 11*

France and USSR discuss joint dry reprocessing facility – *page 14*

Chinese may go into market for cores – *page 14*

NAC and GAC agree on out-of-court settlement – *page 15*

DOE waste transport plans questioned – *page 16*

Future of DOE's extended burnup program still uncertain – *page 16*

PHILADELPHIA ELECTRIC STRIKES 400,000 LBS/U DEAL

Philadelphia Electric Co. is in the final stages of negotiations to purchase approximately 400,000 pounds U308 in two separate deals. Delivery is scheduled for this year, informed sources told NuclearFuel. One purchase is said to be for 300,000 pounds of U308 from **Saskatchewan Mining Development Corp.'s Key Lake** mine for delivery within the next six months. The purchase price is slightly more than $18/lb, a knowledgeable source said. The material is for the utility's Peach Bottom station.

The second purchase is for 100,000 lbs U308, also destined for Peach Bottom. Sources said the purchase price is $18.20/lb. The supplier was not revealed, but it is said to be a U.S. producer.

Philadelphia Electric would not confirm the purchases, but a utility source said the company had recently requested bids on two separate calls of 300,000 lbs/U and was close to filling a portion of the uranium needed. The utility's three reactors, operating on 18-month fuel cycles, require roughly 700,000 lbs per reload. On a "levelized" annual basis, that works out to approximately 13-million lbs/yr. Limerick-2, scheduled to go into commercial operation in 1988 would require another 400,000 lbs/yr.

Although the utility would not confirm amounts under existing contracts, knowledgeable industry sources figured that about 1.1-million lbs/yr or less is scheduled for delivery through 1990 and 300,000 lbs in 1991, under contracts with the SMDC, Union Carbide, Uranerz and Phillips Uranium Corp.

✓ One industry source speculated that the utility needs at least 200,000 lbs/yr in addition to what it is already committed to take, but the utility said it will need much more than that because its existing contracts expire in the early 1990s.

—Michael Ganley, New York

EXXON NUCLEAR WILL REFABRICATE ZIMMER CORE FOR PP&L'S SUSQUEHANNA

Exxon Nuclear soon will begin refabricating what was intended to be the initial core for Cincinnati Gas & Electric Co.'s Zimmer plant for use in Pennsylvania Power & Light Co.'s Susquehanna station. PP&L agreed to purchase the core earlier this year (NF, 23 April, 1) after CG&E said it would convert Zimmer to a coal-fired station.

CG&E has refused to disclose the sale price but said the core originally cost $50-million, including interest. The core has been on

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DUKE SIGNS US PACT for all its needs and gets to use up excess swu in FY-87 . . . *– page 3*

. . . while DOE competitors jump to grab customers who don't want all DOE swu *– page 3*

TVA contemplates setting up its own spot market to buy swu for 1987-88 *– page 4*

Private group would build Avlis but not GCEP, DOE is told *– page 4*

Denison reports record 1983 earnings *– page 5*

U.S. grants long-term reprocessing approval to Sweden and Norway *– page 8*

Pechiney nuclear chief is optimistic about fuel cycle business *– page 9*

AECB issues tough directive to KLMC in wake of spills . . . *– page 10*

. . . while SMDC considers further U3O8 deals to cover needs if Key Lake doesn't produce enough *– page 11*

R&D SHOWS SIGNS OF LIFE IN DOE'S FY-85 WASTE BUDGET *– page 11*

Homestake settles $190-million lawsuit with landowners *– page 14*

Kerr-McGee's 1983 earnings drop 44% *– page 15*

Power failure leads to UF6 loss at DOE enrichment plant *– page 15*

HODEL BACKS AWAY FROM PLAN TO COMBINE WASTE AND ENRICHMENT PROGRAMS *– page 16*

AEP DRIVES SPOT PRICE TO $20.50/LB WITH PURCHASE OF 250,000 KG OF UF6

American Electric Power (AEP) agreed to buy about 250,000 kg of UF6 this year from **Eldorado Nuclear Ltd**. for a price credited with bringing the Nuexco exchange value for U3O8 down to $20.50/lb, informed sources tell NuclearFuel. With the recent reactor cancellation and coal conversion plans announced in the U.S., and more expected, one uranium industry observer says "there is no bottom of the market." Even Nukem, which last year saw the market firming up, now says it appears a long way from recovery.

"We could have a situation similar to 1982," says a Nukem official, "where utilities were out selling inventories, really pushing and selling for whatever price they could get." The difference this time, however, is that there appear to be fewer buyers, he says, and "if there is no demand, there is no demand." The number of buyers in 1982 was reflected by the large volume of spot market business – about 15-million lbs for the year – compared with about 5.5-million lbs last year, he says. "If buyers this year buy as much as last year, that's much less than what's available. That means the market cannot recover at least for some time. How far prices go down is really in the hands of a few people who really want to sell," he says.

The AEP deal is indicative of the situation, sources outside Nukem say. One source says AEP turned the bidding into a "donnybrook" and was able to get "a really rather remarkable price." Word that AEP was looking for uranium came out last summer (NF, 4 July '83, 1) and there were rumors a deal had been struck in September (NF, 26 Sept. '83, 2). AEP denied a deal then, saying that a change of management in the fuel division and the utility's move from New York City to Ohio was delaying the bid review process.

An informed source says AEP is not taking the 500,000 lbs scheduled for delivery this year under a long-term contract with Energy Resources of Australia, but terms of the deal could not be determined.

The Eldorado uranium is to be used for Cook-1, sources say. One source says AEP is expected to solicit bids for about the same amount of uranium for Cook-2 in November. AEP refused to comment. – *Stephanie Cooke, New York*

DOE SAYS 'FLEXIBILITY' IS KEY TO ITS NEW SWU MARKETING ERA

DOE's enrichment chiefs – alternately wooing and warning customers – told them at the Oak Ridge, Tenn. contract meeting last week that the clock is ticking on the benefits of the new utility services (US) contract, and that the promised new enriching technologies, aimed at substantially lowering swu prices, are contingent on a positive response from them before the Sept. 30 deadline.

In a demonstration of its new "flexibility" – a word DOE pressed the parties to try to reach an agreement without a trial. Marshall over the past year has ruled in TVA's favor on a number of motions, but observers noted that his statement in a court transcript in October (Nucleonics Week, 13 Oct. '83, 3) that he was considering ruling that Gulf was liable for damages and letting a jury decide only the amount of damages was an incentive for Gulf to settle.

Marshall had previously ruled that TVA was entitled to treble damages under the antitrust laws. He also had ruled that Gulf "willfully and intentionally placed substantial evidentiary materials in Canada for the purpose of making them unavailable in litigation." He said sanctions were in order for that action by Gulf.

TVA officials would not comment on the nature of the venture firm that Gulf would fund, but sources noted that TVA has been a leader in efforts to create a high technology corridor between Knoxville and the nuclear complex at Oak Ridge, where several nuclear service industry firms are already located. One observer noted that Gulf could "recoup the amount of the entire settlement if the venture thing works out. That is one of those deals where everybody can win."

TVA has previously said that it has recovered a total of about $100-million in cash and services from the various settlements with other producers and Westinghouse. One observer noted that the settlement proposal came just as the Canadian government was dropping its cartel litigation effort. "That did not strengthen TVA's case," he allowed.

– James Branscome, Washington

CANADIAN ANTITRUST PROSECUTION IS DROPPED

The Canadian government has dropped its antitrust charges against six Canadian uranium suppliers but the resentment lingers on. "In view of the Supreme Court decision that the two crown corporations could not be prosecuted it would be unfair to continue against the private companies," a spokesman for Justice Minister Mark MacGuigan told NuclearFuel. "So the minister used his prosecutionary discretion and said there would definitely not be any further action against Canadian uranium producers."

MacGuigan's instructions to special counsel John W. Brown of Toronto to drop the uranium cartel charges came less than a week after the Supreme Court of Canada in a 5-2 decision declared that the government could not prosecute two of its own agencies, Eldorado Nuclear Ltd. (now Eldorado Resources) and the defunct administrator of Canada's former nuclear fuel stockpile, Uranium Canada. These two crown agencies along with four private companies were charged in July 1981 in a Toronto criminal court with conspiracy to restrict competition and supply of uranium to Canadian utilities in violation of the Combines Investigation Act. The four private companies were Denison Mines Ltd., Gulf Minerals Canada Ltd., Rio Algom Ltd. and Uranerz Canada Ltd.

Five Supreme Court justices upheld provincial Judge John Holland who had ruled earlier that Eldorado and Uranium Canada had acted strictly as crown agents and that Canada's Combines Investigation Act "did not bind Her Majesty." Justice Bertha Wilson in dissenting said that no law required Eldorado "to respond to government directives" and she did not think it was immune from prosecution.

When counsel for the four private sector uranium producers appeared before provincial court Judge John Kerr Dec. 22, Brown moved to have the charges dropped. "I have no instructions to take any further action and as far as I'm concerned the matter is now completed," he told NuclearFuel.

The private uranium companies were not anxious to comment on the 20-month prosecution by government combines investigators. "Rio Algom considers it acted according to law and the charges against it were unfounded. It would indeed have been inequitable to proceed with this prosecution" following the exemption of the two government-owned companies, said Rio Algom president George R. Albino. Denison Mines executive vice-president Charles D. Parmalee responded with five words: "The facts stand for themselves."

One participant in the meetings at Johannesburg and Paris in 1972 that set up discussions to fix a floor price for uranium sales told NuclearFuel, "There never was any attempt or intention by Canadian uranium producers to influence supply or price within Canada. In fact, they were expressly forbidden to do so." This participant said others shared his resentment at what they considered a "politically inspired prosecution." He said, "The Progressive Conservative opposition goaded the Trudeau government into ordering an anticombines probe of the uranium cartel allegations because members of Parliament recalled in the fall of 1977 were left sitting on their hands when an expected pipeline debate failed to materialize."

The government anticombines charges in July 1981 followed a three-year effort by Joe Clark, then Opposition Leader, and M.P. Sinclair Stevens to obtain some 40,000 pages of correspondence and other documents which passed between Gulf Minerals Canada and its parent Gulf Oil Corp. The documents

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Sidney M. Stoller of the S.M. Stoller Corp., W.G. Counsil of Northeast Utilities and the editors of McGraw-Hill's nuclear publications are planning a conference to look even harder at the future of the nuclear services market than we did in last year's enormously successful conference. This time, top executives and policy-makers will be addressing such issues as how the shakeout will proceed, who'll survive, how utilities would like the service community to look when it is over, and much more. We're pretty excited about the ideas we've exchanged so far, and we'll soon be providing details. Meanwhile, make a note to reserve the dates.

were demanded by U.S. District Court Judge Prentice Marshall in Chicago in connection with the U.S. antitrust litigation and Gulf claimed it needed the correspondence to prove it was coerced by the Canadian government and did not freely participate in price-fixing. The Liberal government in 1977 enacted the Uranium Information Security Regulations to prevent the movement of these or other such documentation of alleged uranium cartel activities from Toronto-Dominion Bank vaults at Toronto where they remain in custody of lawyers who acted for Gulf but who are not permitted to let U.S. Gulf people have the documents. Gulf petitioned Clark when he was Prime Minister but neither Clark nor Stevens pursued the matter then.

Clark's Progressive Conservative colleagues were furious when the Supreme Court exempted the crown companies and the charges were dropped against the other four. Former Energy Minister Ramon Hnatyshyn accused the government of using a legal ploy to avoid embarrassing Donald Macdonald, a potential Liberal leader candidate, and Sen. Jack Austin, who was deputy minister in Macdonald's Energy Mines & Resources Ministry at the time of the cartel activities. Hnytyshyn told the House of Commons earlier in December that Austin "traveled the world to set up" the cartel. Former Prime Minister Clark said that had the case been allowed to proceed it might "well have revealed" that Sen. Austin was "the architect of the conspiracy."

One source says, "Jack Austin certainly did participate in the meetings at Paris, Johannesburg, and elsewhere. But he was the one who insisted that foreign embassies, including that of the United States, be fully informed of the floor-price arrangements. He and his assistant deputy minister Gordon MacNabb studiously avoided any discussion with Canadian producers about their contract commitments with Canadian nuclear power utilities at the time." – *Ray Silver, Toronto*

PHILADELPHIA ELECTRIC HAS AGREED TO PURCHASE ABOUT 100,000 SWU in FY-85 from the Mexican Comision Federal de Electricidad. The U.S. utility, under the terms of a modified interim sales contract it signed with DOE for Peach Bottom-2, is allowed to purchase 60% of its FY-85 commitments on the secondary market from DOE customers with excess commitments. The Mexicans were scheduled to take about 230,000 swu in FY-85 from DOE for Laguna Verde-1 and -2, according to DOE records.

FLORIDA POWER CORP. IS MULLING OVER MORE THAN A DOZEN OFFERS to provide the 50,000 swu the utility says it will purchase in FY-84 on the secondary market after signing DOE's modified interim sales contract (ISC). The utility says it will make its decision in late January or early February. The amount is part of a total of 150,000 swu needed for the next refueling of Crystal River-3, scheduled in the spring of 1985. Under the modified ISC, offered to DOE customers with 3.5-year requirements contracts, a utility is allowed to purchase up to 40% of its needs in FY-84 in the secondary market.

SWU DEALERS REJECT LAWYERS' PROPOSITION THAT DOE CAN BAR PARTIAL TERMINATIONS

The legal theory advanced by the law firm of Doub & Muntzing that DOE can refuse to permit the partial terminations of requirements contracts (NF, 5 Dec. '83, 1) is wrong, say a number of sources at firms competing with DOE for swu sales.

DOE MAJOR ENRICHMENT WORK NOVEMBER 1983

Kg units of sep. work	Dollars	Enriching customers	End use
53,030	7,946,546	Japco	Tsuruga-1
48,709	7,299,044	NOK	Beznau-1
148,448	22,244,932	Carolina P&L	Brunswick-2
4,468	619,489	Duke Power	Japanese misc. research
16,165	2,422,325	Southern Services	Hatch-2
270,820	40,532,336		
149,754,348	11,318,132,494	Cumulative to date	

The New York Nuclear Corp., a swu broker, first challenged the Doub & Muntzing opinion, which was commissioned by DOE, in its biweekly newsletter. Doub & Muntzing made the mistake of not fully reading Article II of the requirements contract, New York Nuclear said. Although a customer is to obtain his requirements for enriching services for the facilities listed in the appendix of the contract, those services are to be provided "in accordance with the terms and conditions set forth hereinafter." Among those terms and conditions is Article IX, allowing a customer to terminate in whole or in part the enriching services agreement upon written notice to DOE.

"It is clear then that the termination provision in Article IX takes precedence over Article II since that is what the language in Article II provides. Moreover, these two provisions are not in conflict since they were incorporated in the contract with different goals in mind; should this not be the case then one of the two provisions makes no sense at all," the company said.

This critique was amplified in an internal memorandum of another firm competing with DOE for enrichment sales. The memo, drafted by a lawyer familiar with the history of DOE's enrichment contracts, was provided to NuclearFuel on condition that the firm not be identified. According to this analysis, "Doub & Muntzing's suggestion that customers were afforded a right to partially terminate contracts only when construction lags or operational problems affect their needs for enrichment services seems to be without basis either in the history of the enrichment criteria under which the requirements contract was promulgated or – perhaps more importantly – in common sense. A utility must firm up deliveries based on its requirements only 180 days in advance. If delays are encountered, a utility is quite free to firm up zero as its requirement for any given year. Therefore, the only problem a utility would encounter occurs when an unexpected delay takes place after a 180-day firm-up takes place, and before delivery. In this instance, a utility could cancel the delivery by paying a 25% termination charge. (Whether cancellation is economically advisable is a function of how long the delay is expected to last. The utility could subsequently firm up zeros until the interfering problem is resolved, without paying any additional termination charges.

"Doub & Muntzing suggests that 'the requirements contracts must be read as a whole.' Of course they must. But they must be read in such a way that the provisions make sense. An accepted rule of contract interpretation is that contracts will

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Atlas will get $28/lb for 1985 deliveries to PSE&G – *page 2*

Alesio says U.S. government purchases of 120-million lbs in the next six years would defuse the embargo issue – *page 2*

NAC sees U3O8 price at $45/lb by 1990 – *page 3*

Rio Algom profit is up 26% – *page 3*

Preussenelektra considers US swu pact – *page 4*

DOE denies it favors federal lands as repository sites – *page 5*

WALSH PROPOSES TO END ALP'S ANTIURANIUM POLICY . . . – *page 8*

. . . and the Northern Land Council proposes to help him end it – *page 10*

DOE SWU PRICE HIGH IS SEEN PROMPTING conversions to its US contract – *page 11*

Kerr-McGee and WPPSS settle conversion suit – *page 12*

Senators object to 'long-term generic approvals' of reprocessing for Norway and Sweden – *page 14*

DOE says it can hold its waste fee to one mill/kwh through 1989 – *page 15*

AGIP IS SEEN AS LIKELY TO BEAT $17/LB IN 3-MILLION LB NORTHERN STATES DEAL

AGIP SpA is near closing a deal with Northern States Power for the equivalent in UF6 of 1.3-million pounds of U3O8 at a price just under $17 per pound, according to informed sources. The deal is also likely to include purchase by Northern States of another 2-million lbs from AGIP for long-term deliveries at an undisclosed price.

When Northern States called for bids last year (NF, 18 July '83, 8), it was for 4-million pounds for delivery beginning in 1988. Its only supply contract – with Exxon Nuclear for about 600,000 lbs/yr – expires in 1986. – *Michael Ganley, New York*

PP&L TURNS TO COGEMA FOR 86,000 SWU

Florida Power & Light will buy 86,000 Eurodif swu from Cogema Inc., Cogema's U.S. subsidiary, to cover a portion of its FY-84 and -85 requirements, according to informed sources. Although no price was disclosed, informed sources say Cogema Inc. has recently been offering swu at less than $95 each.

DOE OKAYS SOUTHERN CO. SWU PURCHASE

DOE will not challenge the Southern Co.'s purchase of about 130,000 swu from Florida Power & Light and Detroit Edison, even though that quantity exceeds the amount – by about 90,000 swu – that Southern would be allowed to buy under a recently announced "policy clarification" of terms of the new utility services (US) enrichment contract (NF, 26 March, 1), according to informed sources.

The agency's terms for converting to the US contract allows a utility which had a requirements contract to purchase up to 30% of its FY-84 requirements on the secondary market as long as the swu is of DOE origin. DOE's Oak Ridge Operations Office told customers that they could count all of their FY-84 requirements in computing the amount they would be allowed to buy on the secondary market. The Southern Co., sources say, obtained from Oak Ridge a written assurance that this was DOE's policy, and arranged to purchase swu from FP&L and Detroit Edison. But DOE's Washington enrichment office later overruled Oak Ridge, saying a utility could calculate its maximum secondary market purchases in FY-84 using only the amount of requirements not yet ordered from DOE by the date DOE received the utility's letter of intent to convert to the new contract.

According to one source, DOE, wanting to avoid any chance of a lawsuit with "such a good and faithful" customer, has decided not to press its "clarified" policy on the Southern Co., which has promised to take 100% of its requirements from DOE in FY 87 and beyond.

– *Michael Knapik, Washington*

BOSTON EDISON CONTRACTS WITH RTZ GROUP FOR 1.5-MILLION LBS FROM 1985 TO 1990

Boston Edison has a contract with one of the RTZ group companies for delivery of approximately 1.5-million pounds of U308 at a market-related price in the period 1985-1990, informed sources tell NuclearFuel. The utility had been negotiating for several months with Palabora Mining, the South African copper and uranium producer managed by RTZ, but signed a deal with an RTZ company outside South Africa to avoid political problems, these sources say.

The contract does not specify the origin of uranium so "it could come from anywhere," a source says. There are back-up arrangements involved, he says, adding that some material will probably come from Palabora." It could also come from the two other RTZ uranium producers, Rio Algom, which has production in the U.S. and Canada, and Rossing Uranium. In any case, he notes, material can be swapped to avoid the utility receiving South African uranium.

"It isn't the first time this has happened – meaning an RTZ group company has entered into a contract with a customer and backed-to-backed it with one or more of its subsidiaries," he says. "There's a lot of uranium being produced that has to find a home."

Earlier this year, sources said utility board approval of a deal involving Palabora directly appeared in jeopardy because of the objections of one member on grounds that the uranium would be South African. Palabora was anxious to get the deal because it would provide an outlet for most or all of its annual uranium production, 200-250 metric tons produced as a byproduct of copper production. The company delivered 161 MT in the first half of 1983, after which no further deliveries were scheduled.

ATLAS WILL GET AT LEAST $28/LB FOR DELIVERIES TO PSE&G IN 1985

The Atlas Corp. will receive at a minimum $28 per pound for 150,000 lbs of U308 to be delivered to Public Service Electric & Gas in January 1985. The actual price will be market-related but cannot exceed $50/lb. The contract calls for deliveries of 150,000 lbs/yr of U308 from 1985 through 1989, for a total of 750,000 lbs. The minimum price for the 1986 delivery is $31 and the maximum price is $53; for 1987, the minimum price is $34 and the maximum is $56; for 1988, the minimum price is $37 and the maximum is $59; and for 1989, the minimum is $40 and the maximum is $62.

UNION CARBIDE REVIVES OPERATIONS AT COLORADO AND WYOMING MILLS

Umetco Minerals Corp., Union Carbide's newly established mining subsidiary, is stepping up operations this spring at uranium and vanadium plants in Colorado and Wyoming but the company says it has not signed any new uranium contracts.

The company's 1,200 ton-per-day uranium-vanadium mill at Uravan, Colo., where processing was suspended Oct. 31, 1983, will resume operations May 1. Some 80 employees furloughed at that time returned to the payroll in April, joining 60 workers who maintained the facility and received ore during the shutdown.

Umetco's 1,100 ton-per-day Gas Hills Mill at Riverton, Wyo., placed on standby last Dec. 16, will resume processing stockpiled ore April 9. The company is rehiring 17 of the 104 workers who were furloughed last December when mining was suspended. Plans for resuming mining are indefinite. With the return of the 17, the workforce will be increased to 57 Forty employees have been maintaining and securing the properties.

At the company's vanadium mill in Rifle, Colo., operations will resume in early April to handle vanadium concentrates from the Uravan mill. About 30 workers are being recalled. Earl Shortridge, production manager for the company's metals division, said the reopening is to meet a rising demand for vanadium from the steel industry.

Some of the uranium oxide production at the Uravan mill will be used to fill existing contracts and the rest will be stockpiled, Shortridge said.

ALESIO SAYS PURCHASE OF 120-MILLION LBS WOULD EASE PRESSURE FOR IMPORT LIMITS

DOE should stabilize the U.S. uranium market and end the debate over the domestic uranium industry's viability by buying 120-million pounds of U3O8 from domestic producers over the next six years, William G. Alesio, vice president and general manager of Union Carbide's uranium, coal, oil and gas operations told the Atomic Industrial Forum at its annual fuel cycle meeting.

U.S. producers are facing a "survival crisis" because of the lack of demand, utility buying abroad, use of U3O8 inventories, and spot market prices below costs. Many producers, he said, are "unable or unwilling to ride out the storm" and are withdrawing from production because of such market conditions.

The crisis, he added, poses problems for both utilities and the U.S. government. For utilities, the producers' problems conflict, he said, with the desire to assure stable and predictable long-term uranium supplies. The government is concerned about the loss of enrichment fees, unemployment and threats to long-term national energy security, he said.

He said a 120-million pound stockpile, purchased from U.S. "survivors" at a price that would give them a reasonable return on investment would reduce concerns over predictable supply.The government also would be assuring a "viable domestic industry for at least six years" and easing its long-term energy security concerns while avoiding free-trade conflicts and adding significantly to its enrichment business.

His proposal also would give uranium producers, Alesio said, more time to position themselves to compete effectively or withdraw.

While many participants gave Alesio high marks for taking the producer-problems debate a step beyond an import embargo, they said the proposal raised a series of problems of its own. Several participants, for example, said a stockpile program would quickly encounter political and economical problems over how to decide how much uranium should be bought from each producer. One producer said that a stockpile might serve only to delay for another six years the competitive prob-

1982-1986. The uranium was to cover delivery commitments to the Tennessee Valley Authority of some 2.5-million lbs and to repay 2.3-million lbs of U3O8 borrowed from Pacific Gas & Electric (NF, 15 Feb. '83, 4). UNC is supposed to deliver about 1,129,000 lbs to PG&E this summer, and the remainder in 1986. Discussions between UNC and PG&E about a deferral of this year's delivery have so far not yielded any results, according to sources.

UNC reported a 1983 loss of $13-million (compared to a 1982 loss of $14-million), and a continuing sharp decline in 1983 of its working capital. At the end of 1981, UNC reported working capital of $87-million; at the end of 1983, that amount was only $15-million. Late last year, UNC solicited offers to swap its gold and uranium properties for the uranium needed to repay its borrowings (NF, 16 Jan., 4). In UNC's 1983 annual report, Keith Cunningham, chairman and chief executive officer, said it would be advantageous if UNC could buy uranium to cover its borrowings at current market prices of below $20/lb. He said UNC is evaluating "alternatives to cover as much of the entire obligation during 1984 as possible."

GE AND NORTHERN STATES ARE CLOSE ON SPENT FUEL DEAL AT MONTICELLO

Northern States Power Co., citing a lack of confidence in DOE's ability to develop a repository for spent nuclear fuel by the late 1990s, is negotiating to ship 1,058 spent fuel rods from its Monticello plant to General Electric's storage facility in Morris, Ill.

The Minnesota utility has had a long-standing dispute with GE over the ownership of the spent fuel at Monticello. The two companies have been involved in intense negotiations for the past few months in an effort to reach some accommodation without going to court, an official said. The spent fuel pool at Monticello, which has been expanded over the past several years to hold more than 2,200 fuel assemblies, is about half full, he said, and cannot be expanded further.

NSP officials do not believe that a federal spent fuel repository, even an interim facility, will be available by the early 1990s when the Monticello pool would be full. "There is almost no confidence (among NSP officials) in a federal repository by 1998 because of political realities and the 'not in my back yard' issue," the official said.

"Both parties realize this is a better way to do this," he said of the negotiations with GE. He said most of the major issues had been resolved, "and I have a fairly high level of confidence that we will reach a settlement" without a court fight. A GE official confirmed that ownership of the spent fuel rods "was a point in dispute" with NSP. He declined to discuss details of the negotiations and referred questions to NSP. NSP maintains that GE agreed when the plant was built (it went on line in 1971) that "they would supply and be responsible for taking away the first 10 years of fuel. Their plan was to take away the fuel and reprocess it." When the reprocessing option was eliminated in the U.S., the plant's storage pool was reracked and then reracked a second time. The pool was originally designed to hold 740 spent fuel assemblies. "We reracked, but we still maintained the fuel was theirs," the official said.

NSP has been paying a DOE disposal fee for the fuel. "We made a lump-sum payment of $34.5-million that applies to the 1,058 GE fuel assemblies," he said. That payment covered the period from the plant startup through April 7, 1983. Since that date, he said, NSP has been paying the the DOE disposal fee of one mill per kilowatt-hour of generation.

A source said the tenatative plan calls for GE to transport the spent fuel assemblies by rail from Monticello, which is about 40 miles northwest of Minneapolis, to Morris. "We have our own cask cars," the GE spokesman said. "They go into the plant, are loaded, and then they are put back on their wheels." He said the fuel assemblies would arrive at Morris in 30 shipments of two railcars each over a period of several years.

The Morris facility, originally built as a spent fuel reprocessing plant, has two connected 28-foot-deep storage pools that are currently 45-50% full. GE recently agreed to accept spent fuel from Nebraska Public Power's Cooper plant, the GE official said. When that is added, Morris will be 80% filled. "NSP's fuel will bring it to 96% full," he said. That will occur by 1990, he said.

An NSP official said handing the fuel over to GE will not cost the utility anything. "They are assuming responsibility for transportation and storage." By clearing out the Monticello pool, he said, the plant is assured of having on-site storage space well into the next century. NSP had studied dry storage or building another storage pool, he said , but both promised to be extremely expensive. "We hoped we might be able to build a new pool for $11-million," he said. Dry storage of the fuel, he said, would have cost at least $17-million. In the unlikely event that the negotiations should break down, the official said, NSP would still consider taking the issue to court. If a final agreement can be reached soon, he said, the first shipment of assemblies could leave the Monticello plant late this year or early 1985.—*Jim Dawson, Minneapolis*

KERR-MCGEE LOST $2.246-MILLION ON URANIUM OPERATIONS IN THE FIRST QUARTER OF 1984

Kerr-McGee's Quivira Mining Co. and Sequoyah Fuels Corp. lost a total of $2.246-million during the first quarter of 1984, according to company financial reports. That compares to the $2.797-million Kerr-McGee lost during the first quarter of 1983, the report notes. Quivira Mining delivered 145,000-lbs of U3O8 the first quarter of this year, which is down from the 430,000-lbs it delivered during the same period in 1983. Sequoyah Fuels delivered 410,000-kilograms of UF6 during the first quarter of 1984, compared to the 870,000-kg delivered during that period in 1983. The drop in deliveries reflects the continuing depressed state of the nuclear power industry, the report states.

ENUSA WILL BE PAID FOR SPOT SALES LOSSES

Spain's fuel cycle company Enusa (Empresa Nacional del Uranio SA) would receive an estimated 1-billion pesetas ($6.4-million) from the country's utility companies this year in compensation for losses it may incur in selling excess natural and enriched uranium, under a proposal contained in the new Spanish energy plan and expected to be approved shortly by the Cortes (Spain's parliament). The money would be funneled to Enusa via a special fund administered by Ofico, the Spanish governmental compensation office, according to officials in Madrid. The National Energy Plan calls for setaside of 0.6% of 1984 utility revenues for the fund, designed to protect Enusa against potential losses on secondary-market sales. The plan proposes only a one-time levy for the uranium fund, but sources say it could be renewed next year if necessary.

CURRENT URANIUM PRICING INDICATORS
(U.S. $/lb U308)

Source (date)	Price	Last report (date)
DOE (as of Dec. 1983)[1]	39.43	37.30 (Oct. 1982)
Nuexco (March 31, 1984)[2]		
Exchange value	17.75	17.00 (March 1984)
Transaction value	17.75	19.25
Nukem (March 1984)[3]	17.00 18.50	16.25 (March 1984) 17.00

1. DOE sells uranium in emergency cases only. Its list price, established exclusively for this purpose, is a weighted average based on identifiable spot-price sales and market-price contract settlements in the year prior to the reporting date.
2. Nuexco's *Exchange Value* reflects the company's judgment of the price at which sales of significant quantities of yellowcake could be concluded as of the reporting date. The *Transaction Value* is a weighted average price derived from recent sales for which delivery is scheduled within one year of the transaction date.
3. Nukem's price range reflects bids and offers for natural uranium on the international market during the month prior to the reporting month.

U.S. GOVERNMENT INDICES
USED AS U308 CONTRACT ESCALATORS[1]

Index (date)	Value	Last report (date)
GNP implicit price deflator (April 1984)	220.73	218.53 (Mar. 1984)
Producer price index industrial commodities (March 1984)	321.90	320.40 (Feb. 1984)
Gross average hourly earnings, production/nonsupervisory workers		
Metal mining (Feb. 1984)	12.85	12.79 (Jan. 1984)
Primary nonferrous metals (Feb. 1984)	13.40	13.38 (Jan. 1984)
Chemicals and allied products (March 1984)	10.89	10.85 (Feb. 1984)

1. Except for the GNP figures, data incorporated in this table are compiled and published by the U.S. Bureau of Labor Statistics. The base year for the Producer Price Index is 1967 (assigned a value of 100.00). Current figures are subject to later revision by the bureau.
2. The GNP *implicit price deflator* is computed on a quarterly basis by the U.S. Department of Commerce, using 1972 as the base year (100.00). The current value is the seasonally adjusted figure for the third quarter of 1983; the previous value, that for the second quarter of 1983.

Enusa officials refuse to disclose the size of the company's stockpile of natural and enriched uranium, but other sources agree that while it is smaller than that of Italy's Agip SpA, the Enusa inventory is still one of the largest in the world for a single holder. Enusa is making efforts to reduce the size of its inventory, both through spot sales when the market is favorable—the company made some small sales of natural uranium last September, sources noted— and through negotiations involving enriched uranium. The latter include Enusa's arrangement since the second half of 1982 with the Eurodif consortium to take zero deliveries, or far less than its committed 11.1% of capacity, in return for commitments to take the electricity that would have been needed to produce the Enusa swu. Sources said Enusa normally would continue this so-called electricity operation through next year. However, ongoing negotiations with DOE over Enusa's possible conversion of its AFC enrichment contracts to DOE's new US (utility services) contract "would dramatically change Enusa's stockpile situation," a knowledgeable source said. The negotiations involve sale of Enusa swu to the Tennessee Valley Authority (NF, 23 April, 9).

LIST OF NEW U.S. CONTRACT CONVERTS GROWS

Pennsylvania Power & Light, Dairyland Power Cooperative, Texas Utilities Electric, Hokkaido Electric Power, Kansai Electric Power, Korea Electric Power, and Taiwan Power are the latest utilities to give DOE a letter of intent to convert to the new utility services enrichment contract, according to DOE. Duke Power is still the only utility to actually sign a U.S. contract, although DOE says it expects to sign one soon with Detroit Edison.

BECHTEL DROPS REPROCESSING VENTURE

Bechtel National says it is not pursuing development of a commercial reprocessing plant because the venture would fail without federal support. DOE recently turned down a Bechtel proposal to restart the Barnwell Nuclear Fuel Plant. The Bechtel plan called for the federal government to be the principal customer for reprocessing services (NF, 23 April, 12). According to a Bechtel spokesman, "If the government doesn't do something (to back reprocessing), there is nothing the private sector can do."

ABANDONING GCEP COULD INCREASE SWU PRICES UP TO $15, SAYS DOE

If DOE were to abandon the gas centrifuge enrichment plant after selecting the atomic vapor laser isotope separation (avlis) technology over the advanced gas centrifuge process, then swu prices would increase $10 to $15/swu, according to a DOE estimate. This increase would result from including the $2.5-billion that will have been spent on GCEP as of May 1985 in the swu price calculation. That is when the department expects to decide which advanced enrichment pro-

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HIGHLIGHTS

DOE WILL APPLY NO MORE BAND-AIDS in its effort to stop the hemorrhage of its swu business. Shelby Brewer tells AIF - *page 2*

Hawke says let Roxby proceed but hold inquiry into Australian uranium industry - *page 3*

FP&L will seek 3.5-million lbs - below spot - *page 3*

TV report prompts inquiry at Windscale - *page 7*

Westinghouse will rerack at Turkey Point in partial settlement of FP&L claim - *page 7*

South African production inches up . . . *page 8*

. . . as Pathfinders' Ritchie sees room for 'marked increase' in U.S. production in this decade - *page 8*

SECONDARY SWU MARKET STRATEGIES EMERGE from DOE's listing of terminators of requirements contracts - *page 9*

Yugoslavia organizes fuel companies *page 15*

TEMPERATURE MAY LIMIT DRY STORAGE of consolidated spent fuel, researchers say - *page 16*

WE'VE CHANGED OUR PHONES

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CONSUMERS BUYS 130,000 AGIP AND EDF SWU AT AN AVERAGE PRICE JUST UNDER $100 EACH

Consumers Power agreed to buy 500,000 pounds of U3O8 from Exxon Nuclear for slightly less than $24/lb, with deliveries scheduled for February and March, informed sources told NuclearFuel. Of the total amount, 136,000 lbs will be returned to pay back a loan.

The utility also struck a deal, brokered by Nuexco, for purchase of 130,000 swu in August from two sellers at a price which averages slightly less than $100/swu. This includes 30,000 DOE-origin swu it purchased from Electricite de France at about $115 each, according to French sources. The remainder is being sold indirectly by Agip SpA, which swapped swu with a U.S. utility to meet Consumers' request that the swu be of DOE origin, sources said

Bidders didn't go as low as last month's Nuexco swu value of $90 (its latest value - for non-DOE swu - is $85), a utility official said. He attributed that to "rethinking" on the part of sellers following DOE's latest interim contract offer under which buyers can purchase a certain percentage of secondary-market DOE-origin swu without penalty. No penalty was involved with the Consumers' purchase because the utility is not obligated to take any deliveries in FY-84 under an amended delivery schedule attached to its five-year requirements contract, the official said.

He said a delivery is scheduled for next November (FY-85), but that the extra swu was required because of the higher-than-expected capacity factor at Consumers' Palisades plant.

The uranium transaction helped bring Nuexco's exchange value down to $23.50 from $24.00, for the first time in 14 months. Nukem's price range also is down to $23.50-$24.50, from $24.00-$24.75. Sources said several producers were competitive with Exxon's bid. The utility official said, "It was not really price that made us decide, but some of the provisions." Other sources said Exxon had an edge because it has been supplying fabrication and uranium to Consumers for years. - *Stephanie Cooke, New York*

CP&L WILL BUY FROM AGIP AT $80/SWU

Sources say they expect Carolina Power & Light to buy swu from Agip SpA at a price of $80/swu, now that DOE has ruled out any interim sales contract for five-year requirements customers like CP&L. The utility has apparently had the $80/swu offer before it for some time, but has been holding back signing any deal, waiting to see if DOE would offer the fixed-commitment swu price of $138.65/swu to the five-year requirements contract customers. How many swu will be bought is uncertain; CP&L has contracts with estimated deliveries in FY-84 totaling over 500,000 swu.

NuclearFuel

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HIGHLIGHTS

Philippines gets $90/swu offer from UG for Agip material – *page 2*

DOE WEIGHS PRICE DROP for 5-year contract holders, after offering AFC holders a chance for relief – *page 2*

WEPCO LOOKS FOR NEAR-TERM U3O8 – *page 3*

EIA criteria seen prompting a positive finding on U.S. U3O8 viability – *page 3*

ALP weighs arguments favoring U3O8 exports – *page 4*

TVA RAISES ESTIMATES OF DOE POWER DEMAND, but calls DOE's swu forecast a 'wish list' – *page 5*

Japanese fabricators draw praise as government unveils material flowchart for the first time – *page 8*

Eldorado raises UO2 capacity by 40% – *page 9*

DOE bargains with three utilities over $30- to $50-million in spent-fuel ventures – *page 9*

RERACKING APPROVAL FOR OCONEE-3 SETS PRECEDENT for speedier NRC process – *page 10*

Advanced casks seen halving storage costs – *page 10*

Miners say EPA missed another deadline for putting out mill tailings standards – *page 11*

Australia accepts invitation to French test site – *page 13*

Urenco wins contract with PZEM – *page 14*

SCG&E TURNS TO AGIP ONCE AGAIN FOR 180,000 SWU AT $90-92 EACH

South Carolina Electric & Gas has signed a letter of intent to purchase 180,000 more Eurodif swu from Agip SpA, for delivery in FY-84, an official at the utility confirms. He also says that the utility has deferred delivery until FY-84 of an earlier purchase of 100,000 swu from Agip (NF, 6 June, 1), and so will take delivery in FY-84 of a total of 280,000 swu. Because the utility has a five-year requirements contract with DOE, the official says, SCE&G will terminate the 85,267 swu it was scheduled to take from DOE in FY-84 and pay a termination charge of over $5.1-million. The official declines to discuss the price SCE&G is paying for the Agip material, but others speculate that it is in the $90-$92/swu range.

It is unclear how DOE will react to this latest South Carolina deal. This spring the utility and DOE agreed to modify the delivery schedule in Appendix A of the SCE&G requirements contract to reflect SCE&G's belief that it would have no swu requirements in FY-83 and a need for 85,267 swu in FY-84. When it became known that the utility was planning to buy swu in FY-83, DOE said this would be a breach of the requirements contract. The utility said at the time that its needs had changed in just the short period of time when the finishing touches were being put on the contract modification. Quicker-than-expected steam-generator repairs and higher capacity factors for its Summer unit were among the changes cited by the utility. But to avoid further "hassles" from DOE, SCE&G decided to defer that FY-83 delivery.

One DOE official says it appears unlikely that South Carolina can use all of the 280,000 swu in FY-84. If SCE&G were to use any of that 280,000 swu in FY-85, DOE would require payment of additional termination charges, says the DOE official.

– *Michael Knapik, Washington*

COMPETITORS ATTACK NUEXCO'S $90 SWU VALUE

A verbal battle between brokers erupted last week over Nuexco's Sept. 30 $90 swu value. Swuco, in its October market report, called the price a "disservice to the industry." Another broker said it was simply "Agip (SpA) publishing their price," and that it had "nothing to do with anyone else." Nuexco defended the price, but noted that DOE's latest contract offer made it "a brand new ballgame."

Swuco president Walt Wolf said he didn't think even Agip, which is being represented by Nuexco, had sold swu for as low as $90/swu prior to publication of the Nuexco value, although he conceded that deals with the Sacramento Municipal Utility District

IMPORTED URANIUM SEEN RUNNING 20% CHEAPER THAN U.S. DOMESTIC VINTAGES THROUGH JUNE

U.S. utilities paid an average of about 20% less for imported uranium in the first six months of 1983 than they did for domestic supply, according to the latest market survey information from DOE's Energy Information Administration (EIA).

The average weighted price for 1.6-million pounds of imported uranium delivered in the period was $29.95/lb, compared with $37.76/lb from domestic-origin purchases reported by buyers, according to a paper prepared by EIA's Office of Coal, Nuclear, Electric & Alternate Fuels. The mid-year survey was sent to 59 utilities, four fuel fabricators and 57 producers. The weighted average price for domestic-origin uranium represents prices reported on 3.7-million of an estimated 10.1-million lbs delivered. Prices were not reported for 2.9-million lbs, while the remainder was delivered under litigation settlements, EIA said.

Of the domestic-origin uranium for which prices were reported, about one-third had price floors averaging $45.61/lb. That's only slightly higher than the $44.90/lb under contracts with escalating base prices. Price under market-related contracts, commonly based on prevailing prices at or near delivery, averaged $23.71/lb, the EIA paper said.

The average price for foreign-origin uranium is based on 87% of the 1.6-million lbs delivered. That compares to a 1981 price of $32.90/lb, based on 67% of foreign deliveries, and a 1982 price of $25.19/lb for 82% of deliveries.

A downward trend in net delivery commitments with U.S. producers continued in the year's first half, with new contracts for an additional 1.2-million lbs – all spot market transactions with delivery in 1983 – offset by a decrease of 6-million lbs in prior commitments. The net change in delivery commitments over the past 18 months amounts to a decrease of 14-million lbs, EIA said.

Import commitments for deliveries in 1983 and beyond continued to rise, but only slightly, by 400,000 lbs. Last year's survey showed an increase of 28.2-million lbs in export commitments over what was reported as of Jan. 1, 1982. By comparison, export commitments for delivery beyond 1982 decreased by 2.9-million lbs during 1982. Export commitments show an increase of 1.1-million lbs in the first half of this year, but most of the material represents changes in options and litigation settlements.

Unfilled requirements for the 1983-1992 period increased by 3.4-million lbs in the first half of 1983 to a total of 99.9-million lbs. "Buyers, as a group, continue to hold large inventories of uranium, and some have been reducing their inventories through sales and loans," EIA said. A total of 337.5-million lbs of uranium is currently being held, approximately half by DOE and the remainder by private companies. This represents more than nine years of forward coverage, according to EIA.

NORTHERN TERRITORY MP FLOATS PROPOSAL TO TAX AUSTRALIAN URANIUM FOR WASTE R&D

Australian government officials have been asked to report on the possibility of imposing a levy on uranium exports to fund research on disposal of nuclear waste. Waste disposal is cited in the Australian Labor Party (ALP) platform as a major reason for opposition to uranium mining and export, and the levy proposal is seen by observers as a way of appeasing ALP opponents of uranium mining. This would help smooth the way for Prime Minister Robert Hawke to permit owners of existing mines to sign new contracts, to reaffirm approval for Roxby Downs and perhaps to begin work to liberalize further the party's uranium policy at the next federal conference in mid-1984.

The government's uranium policy review was postponed in September (NF, 26 Sept., 5) and the cabinet is now expected to consider at least six submissions on the subject next week. The delay was thought necessary to give Hawke time to gather support for his "liberal" interpretation of the party's uranium platform.

At issue in the current review are "negotiating licenses" for Energy Resources of Australia Ltd. and Queensland Mines Ltd., and the future of Roxby Downs. Present ALP policy is quite unequivocal in not allowing new mines, said Lewis Kent, a left-wing member of the federal Parliament. "Not even Mr. Hawke is suggesting that," he said.

The levy proposal was made to Minister for Resources & Energy Senator Peter Walsh by John Reeves, an ALP MP representing the Northern Territory. The territory contains Australia's existing uranium mines and the two new projects – Jabiluka and Koongarra – that are closest to commercial development. According to Reeves, more than 70% of territory residents polled recently believe that uranium should be mined.

Reeves said he believed that existing and potential producers "should wake up to the fact" that the major problem mentioned in the ALP policy is waste disposal. Waste is either diverted to nuclear arms or is left "sitting around" in a potentially dangerous form, he said. If producers are willing to contribute to a fund to research and develop waste disposal techniques, it offers them an opportunity to show their concern, he said. It would also help overcome waste disposal problems; it would cut off, to a greater extent than at present, the possibility of Australian uranium being diverted for nuclear arms, and, if the technology were developed in Australia, it would offer significant money-earning potential.

Walsh raised the levy possibility late last month with the Northern Territory Chamber of Mines, which represents the territory's mining and exploration interests. According to executive officer Michael Gamble, the matter apparently enjoyed the minister's support, but was raised only briefly and the chamber has not yet had time to consider the proposition. It is likely to be discussed briefly at a meeting next week, he said, but such a proposal would require detailed examination.

Gamble stressed the chamber's concern that political issues were delaying development of a valuable export industry with the potential to contribute dramatically to the Northern Territory's economic and social development. Uranium is already Australia's fifth most important mineral export, and with development of Koongarra and Jabiluka could become third, he said. The Chamber of Mines "does not accept for one minute" the government's assertion that there is no market available at present for Australian uranium. Further, unemployment in the Northern Territory is higher than the national average and growing, and the economic base in the territory "is so slim" that only mining has the job-creation potential needed

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EIA's ASSESSMENT OF THE U.S. URANIUM MARKET
(millions of pounds U3O8 equivalent)

ales to mestic uyers (1)	Commitments to foreign buyers (2)	U3O8 available for sale (3)	Foreign uranium purchases (4)	Unfilled require-ments (5)
20.7	1.9	6.5	6.8	0.5
18.9	1.0	8.6	7.0	3.5
20.5	1.4	8.2	8.3	1.9
21.8	1.2	8.2	8.8	4.7
19.5	1.1	8.6	8.0	5.8
17.8	1.1	7.9	6.5	8.3
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Foreign inroads reached three times further in '82
– page 13

OTHER HIGHLIGHTS

DOE's inspector general wants big changes in interest component of swu price *– page 2*

CBO says centrifuges are the best buy but enrichers may lose on any investment *– page 3*

ERA GETS CONTRACTING 'FLEXIBILITY' for its effort to penetrate the U.S. market *– page 3*

Ranchers is pressed on merger *– page 4*

Cogema hits revenue and export targets and chalks up another loss *– page 5*

NRC waste confidence finding wins it a no-confidence vote *– page 8*

DOE MAY TAKE A BATH IN ITS WASTE REPOSITORY if its disposal fee is as little as one mill per kilowatt-hour, the agency figures *– page 9*

State and tribes oppose DOE tailings cleanup plan . . . *– page 11*

. . . while AMC opposes EPA's standards for active tailings dumps as a major threat to U.S. miners *– page 12*

Homestake works on a deal to work a 10-million lb deposit . . . *– page 15*

Anaya beheads EID for inaction *– page 16*

URANERZ SEEN AS MOST LIKELY SUPPLIER OF 2-MILLION LBS TO COMMONWEALTH EDISON

Commonwealth Edison has concluded a deal for supply of uranium, informed sources say. Details were not available but sources believe the contract is for more than 2-million pounds of U3O8 and that the likely supplier is Uranerzbergbau GmbH. The utility at one point appeared to want low-cost Canadian uranium but was effectively prevented from getting it because of Canada's policy requiring upgrading (NF, 4 July, 8). Uranerz, whose Canadian subsidiary owns a one-third stake in the low-cost Key Lake project in Saskatchewan, recently borrowed about 500,000 lbs of U3O8 from RWE (Rheinisch-Westfaelisches Elektrizitaetswerk), according to an informed source, and borrowed about the same amount from RWE a year or two ago. The uranium is to be paid back in 1985 or 1986, the source said. In its call for bids earlier this year, Commonwealth sought a total of 2.5-million lbs from 1983 through 1987, with deliveries on a schedule of 500,000 lbs/yr (NF, 3 Jan., 1).

– Stephanie Cooke, New York

DOE STRIKE AGAINST DISCOUNT SWUS MAY BE LATE BUT STILL EFFECTIVE

DOE's strike against the secondary swu market last week was effective, most brokers say. They feel that in the period covered by DOE's offer of reduced prices for the most likely buyers (FY-83 through '85) a lot of excess swu remains to be sold, but – with the exception of that held by Agip Nucleare (AGN) – it probably won't be. Their estimates of the excess range from 1- to 5-million swu. One broker, however, thinks the DOE move may have come a little too late. He reasons that much of the non-U.S. swu that DOE was trying to prevent U.S. utilities from buying already has been bought.

Beyond FY-85, prospects for the secondary market aren't bright, by most estimates. For one thing, terms of DOE's new facility requirements (FR) contract are expected to be favorable to utilities and thereby reduce secondary market activity. Also, according to one broker, "after '85 there's very little excess DOE commitment. That's the key." Another broker is optimistic that secondary market trading will pick up as utilities convert to the new FR contract because there will be excess swu to trade, but a competitor, while seeing a slight rise in business, says there won't be enough to keep all the brokers in business.

Under the new interim sales contract offered July 25, holders of 3.5-year requirements contracts can pay the prevailing fixed-commitment contract price in exchange for waiving further rights to cancel deliveries through FY-85. That means an $11.20/swu discount off the $149.85/swu requirements price this year. In addition, first contract with South Carolina Electric & Gas (NF, 20 Dec. '82, 2), the deal includes uranium, conversion and Eurodif enrichment services. Quantity and price were not disclosed. The South Carolina deal calls for delivery of 22,000 kg of enriched UF6 at a fixed price in late 1987 or early 1988.

-- *Michael Knapik, Washington*

SWEDEN EXPECTS TO TAKE A YEAR TO REVIEW WHETHER TO DROP REPROCESSING CONTRACTS

Swedish utilities will decide in about a year whether or not to drop out of the utility group which has signed up for reprocessing at Cogema's UP-3 plant at La Hague, according to a number of well-placed sources. Sweden is now comparing costs of reprocessing at La Hague against costs of direct disposal of all Swedish spent fuel. The evaluation includes the possibility that utilities will not be able to recover all the money advanced for construction of UP-3 under contracts signed in 1978, sources say.

Swedish officials were already having second thoughts about reprocessing and reportedly reacted strongly to Cogema's announcement last month in Lucerne that the projected cost of UP-3 had risen by a good 30% (NF, 20 June, 12). Cogema also said that the plant's projected operating capacity had increased by 15-17% to an average of 700 tonnes/year spent fuel. Since the amount a customer is obligated to reprocess is based on a percentage of operating capacity, Sweden would have to deliver about 112 MT of spent fuel more than the 672 MT under the original capacity projections if it wanted to achieve the lowest unit cost. Its UP-2 contract obligates Sweden to 57 MT worth of capacity.

Other governments also were upset by the Cogema announcement, sources say, but for a different reason. Those governments, primarily West Germany and Japan, fear the additional capacity would hamper plans for their own reprocessing plants by reducing the justification for them – particularly in the eyes of U.S. officials whose approval is necessary for reprocessing U.S.-origin spent fuel.

There are also worries as to whether Cogema can deliver the increased capacity. The Germans, in particular, fear that without an iron-clad guarantee, their licensing authorities will insist on backup plans for spent fuel disposition. (The authorities require utilities to make provisions for all spent fuel at least six years in advance.)

On the other hand, if the capacity can be counted on, sources say the German utilities may be tempted to buy additional capacity at discounted prices and that, in turn, might upset plans for a domestic reprocessing plant (now expected to start up in 1992-93).

According to Cogema, the worries are unfounded. The total 7,000 MT projected output (from 1988-98) will be confirmed in writing to customers, according to a Cogema official, and the company has already received "one or two letters" from customers interested in the extra capacity. He says he has "no worries" that there will be too much reprocessing capacity around when UP-3 operates. "There are plenty of takers," he says.

But one customer source reports "a lot of agitation" within the so-called baseload customer group (30 utilities from six countries), as each utility evaluates the pros and cons of accepting the additional reprocessing and, if not interested, tries to find potential buyers. Sources say that the Swedes have been exploring the possibility of utilities, particularly in Switzerland and Japan, taking over the Cogema contracts.

An official with SKBF, the Swedish Nuclear Fuel Supply Co. which manages the back end of the fuel cycle, says "it's too early to comment" on possible termination of the UP-3 contracts. "At present these contracts are still a prerequisite for the operating licenses (of five Swedish reactors)," he says, and "we certainly intend to uphold them."

So far only one utility has left the UP-3 baseload group. This was Gemeinschaftskernkraftwerk Tullnerfeld (GKT), the Austrian consortium whose reactor lies idle because of a negative popular referendum vote. GKT's reprocessing was transferred to Belgian and German utilities. Japanese utilities, too, have shifted their commitments among themselves. One source suggests that the extra 1,000 MT, coming on top of a possible liberation of nearly 700 MT from Sweden, could lead to "digestion troubles" for some utilities within the group. Even officials of Swiss utilities, who say they can absorb some extra capacity, add that they are reaching the saturation point.

The situation regarding the UP-3 contracts is expected to be resolved in December, when the baseload customers meet with Cogema in Paris. The baseload customers, sources say, may hold a separate meeting before then to organize their response. – *Ann MacLachlan, Paris*

BALTIMORE GAS & ELECTRIC AND THE SASKATCHEWAN MINING DEVELOPMENT CORP. are continuing talks about possible uranium purchases several years from now, according to informed sources. One source says he was surprised to learn about the talks, figuring BG&E was out of the market after its 2-million-pound purchase from Westinghouse late last year (NF, 8 Nov. '82, 1). That purchase is expected to cover the utility's needs for most of the decade. An informed source said BG&E may be interested in contracting for a substantial amount in addition to the Westinghouse material but that "a contract with Baltimore Gas & Electric would not start for some years."

NORTHERN STATES WANTS BASE PRICE FORMULA AND FLEXIBILITY ON 4-MILLION LBS U3O8

Northern States Power is seeking bids for delivery of 4-million pounds U3O8 over a 10-year period beginning in 1988. Sources say the utility prefers a base price with escalators as opposed to a formula tied to the spot market, and wants as much flexibility as possible on delivery dates to accommodate varying fueling cycle lengths at each of its three reactors. The utility also wants a force majeure clause under which it could refuse deliveries in the event of an unplanned reactor shutdown.

In its request for bids, the utility listed three options. The first is for delivery of 1-3 reloads/year for 5-10 years, with each reload equal to 240,000 lbs U3O8; the second is for 240,000 lbs/yr or 480,000 lbs/yr for 5-10 years with the shipment schedule to include quantity and delivery date flexibility; the third is for a total of 4-million lbs over 10 years with deliveries determined on a yearly basis as needed.

The options are intended to generate a wide range of offers, sources say, but basically the utility is looking for blocks of 240,000 lbs each as needed. Its three reactors (Monticello and Prairie Island-1 and -2) generally operate on cycles of 13-

15 months, but there are no fixed refuelings, because they are "run until they're out of fuel," a source explained.

The utility's policy is to take no more than one-third of its fuel from non-U.S. sources, but sources say that is not strictly adhered to and won't necessarily influence supplier choice. About half its current deliveries are of non-U.S. origin under a contract with Exxon Nuclear. That contract, for about 600,000 lbs/yr, supplies all Northern States' needs and ends in 1986. Excess inventory is expected to carry the utility for about another year until deliveries under new contracts begin. Bids are due July 29.

SMUD AGAIN TURNS TO AGIP FOR 200,000 SWU OVER BIDS FROM U.S. UTILITIES AND MEXICO

Sacramento Municipal Utility District once again has bypassed DOE's enrichment enterprise, picking Agip Nucleare to supply nearly 200,000 swu for its Rancho Seco 967-Mw unit.

Before awarding the contract, valued at $23,822,182, to Agip, Smud studied proposals from four brokers representing sellers of both DOE and foreign swu. Gordon Merrill, Smud's manager of purchase and stores, also said that for the first time, the Comision Federal de Electricidad of Mexico contacted the utility.

Besides the payment to Agip, the five-member Smud Board of Directors approved an appropriation of $2,873,506 as termination charges to DOE and $200,000 as a contingency fund for adjustments to the quantity of enrichment services or termination charges. This places the total amount of the transaction at $26,895,688. Merrill said that once the utility had done an initial analysis of the proposals from the various brokers it was clear no bid came close to matching the one from Agip, though the Mexican offer was relatively competitive.

Merrill said the district's total savings from the Agip contract in comparison to its existing contract with DOE will be $6,215,301. In comparison to DOE costs, the contract can save $2,825,262 to the district on enrichment of 186,816 kgU for batch 10 to be loaded in late 1985 or early 1986 and $3,390,039 on 173,472 kgU on batch 11, to be loaded in mid-1987, Merrill reported. The contract calls for delivery of 197,482 swu at 0.3% tails assay for the two batches. The first batch totals 102,398 swu; the second 95,084, said Merrill.

"Agip Nucleare is the most advantageous to the district on both price and availability," Merrill said of the contract. "Every dollar increase on the Department of Energy's current price of $149.85 for enrichment between now and July 1985 will result in an additional savings to the district of $197,482. The same degree of increase between July 1985 and January 1987 will result in further savings of $95,084 for the district."

While Smud must observe confidentiality in negotiations, the district was able to identify the brokers involved. Representing Agip was Nuexco of Menlo Park, Calif., which also represented DOE swu holders and Eurodif France; Nuclear Resources International of Atlanta represented a seller of DOE swu and Nukem of White Plains, N.Y. represented one DOE seller and one West German firm which would have provided uranium enriched in the Soviet Union.

Smud's earlier contact with Agip was approved in March and involved enrichment of 172,687 kgU at a cost of $10,760,000 for fuel to be loaded in 1984 (NF, 14 March, 1).

– Tom Arden, Sacramento

URANERZ STRESSES VARIETY IN U3O8 'GAME' AND RATES ITSELF A FAIRLY GOOD PLAYER

"Variety is the name of the game" in the uranium business, asserts an official of Uranerzbergbau GmbH. By his reckoning, the West German producer has played well, selling first Rabbit Lake, then Key Lake, uranium to a number of customers under a variety of terms, and establishing itself in the market both inside and outside West Germany.

"We can look to the future with more ease than two years ago," he says of the company's Key Lake marketing efforts. Some of its one-third share in the 12-million pound per year project remains unsold, but "we have reached a sales position with which the company is satisfied and we have indeed reached it earlier than we and many others expected."

Participation in Rabbit Lake "clearly helped us in marketing Key Lake," he adds, noting that Rabbit Lake customers such as Belgium's Synatom also are buying from Uranerz Exploration & Mining, the Uranerz subsidiary which holds the Key Lake shares. RWE (Rheinisch-Westfaelisches Electrizitaetswerk), a part owner of Uranerz, also helped, first by covering part of its needs through a long-term contract for Rabbit Lake uranium, and more recently, through a 10-year deal for almost 4,000 tonnes of Key Lake uranium. Other customers include Ontario Hydro and several U.S. utilities.

Uranerz has so far not ventured to the Far East and appears somewhat hesitant to do so, feeling apparently at this point that its efforts wouldn't pay off. Japan is an "interesting market," the official says, and it would be "good to have some share." But it "wouldn't be useful to penetrate" now.

"It may be the most competitive market situation which has ever been," even though only three parties were involved (Eldorado Nuclear Ltd., the Saskatchewan Mining Development Corp. and Uranerz), the official says of the Key Lake selling effort. "It has never been a game of undercutting people on the price side," he says, and it is "completely misleading" to say that pricing provisions under all Key Lake contracts are linked to spot prices. "There are a few," he says, adding that "we have also" linked prices to the spot market.

In the U.S., he says, Key Lake contracts are strictly tied to the spot market because public utility commissions (PUCs) have required that utilities never pay higher than the spot price. That is a "catastrophic, unreasonable requirement on the part of the PUCs," and a "destabilizing factor for the whole world market," he says.

In Europe, there are Key Lake customers with Nuexco-related price provisions, he says, but there are other criteria for determining price as well. He concedes that Nuexco or Nukem prices would apply during relatively stable market conditions, but adds that "I don't know of one European contract where there is a strict link to Nuexco and nothing else."

Uranerz contracts always contain a minimum price, the official says, adding that he was surprised that the Canadian government approved a flexible floor price provision under the SMDC-Vermont Yankee contract (NF, 11 April, 1). The contract sets a $15/lb minimum price with escalation but allows the buyer to pay below that if the Nuexco-related price dips below that. Credit accrues to the seller, but the difference is made up only after the Nuexco price climbs above the "minimum." That is "not the traditional definition of a floor price," the official says, and "we are surprised."

A Canadian government official expressed surprise in re-

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'GLORIFIED SPOT PURCHASES'

U_3O_8

Uranium bought from Energy Fuels Nuclear and Western Nuclear appears to be just that.

– page 8

OTHER HIGHLIGHTS

GKN turns to Urenco for 10 years' swu – *page 3*

LOSS OF SPENT FUEL COOLANT need not be considered by applicants for reracking if it isn't likely to occur, says an NRC appeals board overruling a licensing board – *page 4*

WPPSS MAY SAVE $350-MILLION ON RELOADS from Exxon Nuclear, thanks to a county judge's ruling – *page 4*

Asamera denies that it has sold most of its share in Dawn Lake – *page 12*

Hydro sees its fuel bill doubled by Elliot Lake uranium – *page 13*

Waste policy act proves hard to follow – *page 13*

EPA tailings standards – *page 14*

ELDORADO AVOIDED A BIG LOSS IN '82 by buying GMCL and Uranerz with U3O8 – *page 15*

Gulf loses a bid for a summary judgment in TVA's antitrust suit – *page 16*

SOUTH CAROLINA ELECTRIC & GAS WILL BUY 100,000 EURODIF SWU FROM AGIP NUCLEARE

South Carolina Electric & Gas is expected to sign a contract with Italy's Agip Nucleare within the next several weeks for delivery before October of about 100,000 Eurodif swu, knowledgeable sources say.

Price was not disclosed; Agip has recently sold swu in the U.S. at $115 each. Unlike other recent deals where U.S. utilities have purchased foreign swu, SCE&G is not terminating any DOE swu commitments, however. Late last year, the utility told DOE it did not expect to have any swu requirements in FY-83, so DOE amended the swu delivery schedule contained in SCE&G's requirements contract. However, the utility's Summer unit operated at a capacity factor in January (43.9%) and February (43.6%) above what the utility expected based on previous experience in the industry with newly started reactors. In addition, repairs to the unit's steam generators in March took less time than expected. Thus, the utility found itself with a need for more enriched uranium this year. SCE&G had expected to take its next delivery of 85,000 swu from DOE in January 1984. With the purchase of the Agip material, that delivery will be pushed back to later that year. – *Michael Knapik, Washington*

DOMENICI DUTY WOULD COVER REGULATORY COSTS

Sen. Pete Domenici (R-N.M.) was poised at press time to introduce a bill to impose a duty on imported uranium. The bill – which would remove any price advantages enjoyed by foreign uranium producers by virtue of their not having to comply with environmental regulations as tough as those in the U.S. – is modeled after one that Rep. Morris Udall (D-Ariz.) has sponsored for the copper industry. Under both bills, the Administration would be left to figure out how to determine the difference in regulatory costs and that would be the tax on imports. Domenici is expected to cite Udall, who said on introducing his bill that foreign producers "who are not subject to reasonable environmental standards save substantial cost and thereby obtain an extremely unfair competitive advantage over our domestic industry."

CONGRESSIONAL BUDGET OFFICE SAYS DOE SWU WILL COST LESS IF AVLIS IS ABANDONED

DOE swu will be most economical through the year 2025 if the agency abandons atomic vapor laser isotope separation (AVLIS) in favor of gaseous diffusion and advanced centrifuges, according to a draft analysis by the Congressional Budget Office (CBO). The draft obtained by NuclearFuel is called "preliminary" but is being circulated to the congressional committees now considering DOE's enriching piles which could in some cases be more stringent than existing NRC requirements. But because the EPA regulations would also allow for site-specific modifications of those standards, EPA officials say that in practice, the proposed requirements might not impose any new obligations on mill operators. The Uranium Mill Tailings Radiation Control Act of 1978 requires that these standards be drafted so that they are "consistent" with general EPA requirements for other facilities adopted under the Solid Waste Disposal Act.

In general, the EPA groundwater standards would require a mill operator to take corrective action at existing tailings piles if it were found that concentrations of substances such as arsenic, molybdenum, and selenium in groundwater affected by the pile exceeded concentrations normally found in the water in the area. Current NRC regulations would allow higher concentrations of those substances to seep into the groundwater so long as the water is not rendered hazardous for certain usages. – *Michael Knapik, Washington*

ELDORADO SPARED 'SUBSTANTIAL' LOSS IN '82 BY TRADING U3O8 FOR GMCL AND URANERZ

Eldorado Nuclear Ltd.'s acquisition of Gulf Minerals Canada Ltd. and Uranerz Canada Ltd. last year (NF, 11 Oct. '82, 11) saved the company from a "substantial loss," said Eldorado chairman and chief executive officer Nicholas Ediger. Net earnings for the year were $4-million (all figures are in Canadian dollars), compared with a loss of $129,147,000 in 1981, which includes the shutdown of Beaverlodge.

"Revenue increased by 24% during the year to $88.8-million from $71.8-million in 1981. In addition, the company realized nonrecurring other income of $12-million on the sale of inventory in return for Gulf's working capital," the crown corporation said.

For the first time, Eldorado disclosed how much inventory it traded for the GMCL-Uranerz properties – 10,340,000 pounds U3O8. A company official explained that the $12-million represented the difference between what Eldorado figured it cost to acquire the uranium and the value it was assigned in the transaction.

Net noncurrent assets acquired in the deal amounted to $102,013,030, consisting of property and equipment of $122,013,030, less a noncurrent liability of $20-million, the company said. Working capital of $85,616,562 also was acquired. Besides a 5.5-million lb/yr mill at Rabbit Lake, which was owned jointly by GMCL and Uranerz, Eldorado says it acquired reserves totaling more than 66-million lbs U3O8 in the deal.

Eldorado spent $122-million to purchase property and equipment as part of the Rabbit Lake acquisition, the company said. Another $31.4-million was spent on development costs for the Key Lake mine and mill, in which Eldorado holds a one-sixth interest.

Also, the company spent $114.2-million on constructing the new Blind River refining and Port Hope conversion facilities. The refinery is expected to be completed in July, while the second conversion plant at Port Hope is scheduled for completion in December. The company's processing capacity will virtually be tripled after these projects are completed – to 18,000 tonnes of uranium, and the company said the projects "are expected to be completed within their budgets with no significant delays from their original schedules." The expansion is being financed mostly through capital borrowings. Last year, $238.8-million was raised in the U.S., Japan and Switzerland.

CURRENT URANIUM PRICING INDICATORS

(U.S. $/lb U3O8)

Source (date)	Price	Last report (date)
DOE (as of Oct. 1982)[1]	37.30	36.30 (Jan. 1982)
Nuexco (April 30, 1983)[2]		
Exchange value	23.25	22.25 (March 1983)
Transaction value	21.40	21.35
Nukem (May 1983)[3]	22.25- 23.00	21.85- (April 1983) 23.00

1. DOE sells uranium in emergency cases only. Its list price, established exclusively for this purpose, is a weighted average based on identifiable spot-price sales and market-price contract settlements in the year prior to the reporting date.
2. Nuexco's *Exchange Value* reflects the company's judgment of the price at which sales of significant quantities of yellowcake could be concluded as of the reporting date. The *Transaction Value* is a weighted average price derived from recent sales for which delivery is scheduled within one year of the transaction date.
3. Nukem's price range reflects bids and offers for natural uranium on the international market during the month prior to the reporting month.

U.S. GOVERNMENT INDICES USED AS U3O8 CONTRACT ESCALATORS[1]

Index (date)	Value	Last report (date)
GNP implicit price deflator (March 1983)	213.41	210.42 (Dec. 1982)
Producer price index – industrial commodities (March 1983)	313.40	314.40 (Feb. 1983)
Gross avg. hourly earnings, production/non-supervisory workers		
Metal mining (Feb. 1983)	12.65	12.62 (Jan. 1983)
Primary nonferrous metals (Feb. 1983)	13.22	13.29 (Jan. 1983)
Chemicals and allied products (March 1983)	10.44	10.44 (Feb. 1983)

1. Except for the GNP figures, data incorporated in this table are compiled and published by the U.S. Bureau of Labor Statistics. The base year for the Producer Price Index is 1967 (assigned a value of 100.00). Current figures are subject to later revision by the bureau.
2. The GNP *implicit price deflator* is computed on a quarterly basis by the U.S. Dept. of Commerce, using 1972 as the base year (100.00). The current value is the seasonally adjusted figure for the first quarter of 1983; the previous value, that for the fourth quarter of 1982.

Operating costs were $80,932,000 against $73,779,000 in 1981. Earnings before taxes and other deductions were $7,886,000 against a loss the previous year of $1,891,000, while income taxes and mineral royalties were, respectively, $3,886,000 and minus $362,000. The latter is applied against future income tax, an Eldorado official said.

As of the end of 1982, Eldorado had commitments for delivery of 22,534,600 lbs U3O8 from 1983 to 1991. The

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RWE and Uranerz near a deal for 4,000 tonnes of Key Lake uranium – *page 4*

Rossing continues to buoy RTZ's net – *page 4*

DOE may soon be in position to decide when to close its diffusion plants – *page 5*

Wyoming Mineral buys Conoco out – *page 6*

TVA finds another uranium borrower – *page 6*

MKU makes its last deliveries – *page 7*

Honeymoon partners seek compensation – *page 7*

Koongarra landowners agree to delay – *page 8*

DOE SLOWS WORK AT HANFORD while addressing NRC concerns about reliance on defense-in-depth at its prime site for a waste repository . . . – *page 9*

. . . but speeds its proposed contract for deliveries to that repository – *page 10*

DUKE POWER'S SPENT-FUEL STRATEGY is to avoid reliance on federal government – *page 10*

NRC sets loose criteria for proving away-from-reactor storage of spent fuel is needed – *page 12*

State Department sees pitfalls for U.S. utilities reprocessing abroad – *page 12*

SMDC writes of $11-million it spent on prospecting – *page 14*

JAPANESE UTILITIES AGREE TO PAY $32-35/LB FOR URANIUM IN '83 AND '84

Japanese utilities have in recent weeks agreed to prices between $32 and $35 per pound U3O8 for deliveries in 1983 and 1984, informed sources told NuclearFuel. That's less than they're currently paying, but not as much less as the $5-$10/lb cuts some utilities sought (NF, 31 Jan., 1).

The 1984 price for uranium from the RTZ group (Rossing in Namibia, Mary Kathleen Uranium (MKU) in Australia and Rio Algom in Canada) is $34.25/lb, sources say. That, according to MKU chairman Jack Liebelt, is 3% (about $1/lb) less than the 1983 price, and "considered satisfactory in present world circumstances." The only other supplier negotiating prices in Japan a year in advance of deliveries, the Nuclear Fuels Corp. of South Africa (Nufcor), obtained a price of $33.50/lb for 1984, sources say.

France's Uranex got somewhere between the RTZ and Nufcor price for 1983 deliveries, and Japan's Overseas Uranium Development Corp. (OURD) about $32/lb, these sources say. The price for Ranger uranium from Australia, set by contract, is above $38/lb this year. Queensland Mines and Denison haven't negotiated their prices and the situation with other suppliers is not known.

The relatively modest drop in prices from a year ago is attributed in part to the recent rise in spot market prices coupled with what sources say is a desire on the part of Japanese utilities to maintain good relations with long-term suppliers. The biggest drop occurred between 1981 when utilities paid roughly $45/lb and 1982 when they paid $37-$38.50/lb.

PASNY TO BUY 102,000 SWU FROM ENEL

The Power Authority of the State of New York (Pasny) has agreed to purchase 102,000 swu of Eurodif-origin from Enel, the Italian electricity producer. The swu would be for delivery in FY-84 for use in the FitzPatrick unit. Details of the transaction were not immediately available, but it is known that Pasny chose Enel's offer, which was brokered by Swuco, over several others.

APS GETS TO CHECK WESTINGHOUSE PROFITS WHILE IT CARRIES UF6 UNDER FABRICATION PACT

When Arizona Public Service (APS) starts taking reloads from Westinghouse for its three Palo Verde units, probably in 1986, it will have the supplier's assurance that the prices paid won't increase Westinghouse's profit margin. In return, APS will start helping Westinghouse carry enriched uranium. For, under the contract signed in 1974 and amended in 1981, the utility agreed to pay for enriched UF6 from Westinghouse amounting to 6% more than re-

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DOE HINTS AT TRADE ACTION AGAINST COGEMA, INC. SAYING THE COMPANY IS PREPARING "TO DUMP" SWU

Once again DOE is threatening to file an unfair trade action to protect its enrichment business. The target of DOE's ire is said to be COGEMA, Inc., which is trying to sell long-term contracts of Eurodif SWU to U.S. utilities.

According to a senior enrichment official, DOE has learned that COGEMA has offered the Vermont Yankee Nuclear Power Corp. a 10-year enrichment contract for all of Vermont's requirements at a price – in U.S. dollars – that will be 30% less than whatever DOE will charge its customers who sign the utility services (US) contract. The COGEMA offer means, said this official, that if DOE starts selling some SWU to its customers at a price based on marginal production costs ($60/SWU has been mentioned as such a price), then COGEMA will sell a similar percent of its SWU at a price 30% lower than DOE's marginal price. The sale of SWU at the prices that COGEMA is proposing "is dumping," said this enrichment official. "DOE can't afford not to act," he said, to counter the threat of this "anticompetitive practice."

The senior official said DOE has had recent telephone discussions with U.S. Commerce Department officials about the filing of an antidumping petition, and DOE will be having face-to-face meetings with Commerce Department officials soon. He added that the enrichment office, with DOE Secretary Donald Hodel's blessing, will notify its U.S. enrichment customers that the department intends to file a trade petition to prevent SWU from being dumped in the U.S.

COGEMA released a statement saying, "We have no knowledge of any antidumping petition which DOE may be considering. Therefore we must withhold comment until we are fully apprised of the facts. There is no apparent basis in law for such a petition." COGEMA officials refused to confirm even that they were negotiating with Vermont Yankee.

One knowledgeable industry observer said that DOE's strategy right now may be to try to "sew confusion in the camp of the enemy," by revealing terms supposedly being offered Vermont Yankee. DOE may hope to rile customers who may have been offered less attractive terms by COGEMA, he said.

Under U.S. trade laws, DOE could allege that the sale of Eurodif SWU is being unfairly subsidized by the French government or the SWU are being sold in the U.S. at less than fair market value. In either case, duties could be imposed on the SWU to eliminate the effect of unfair pricing.

In early 1983, DOE let it be known that it was serious about filing an unfair trade petition to stop Eurodif SWU from being sold by ENEL, the Italian state utility, on the U.S. secondary market (NF, 14 Feb. '83, 1). DOE later decided not to file a petition because of concerns that such an action might hurt DOE's efforts to sign further enrichment contracts with foreign utilities, might provoke retaliatory actions by foreign governments against U.S. products, and might tie the department up in lawsuits even if it were to win its trade case (NF, 11 April '83, 1).

cause the design uses modular sections that are easily handled by conventional machine tools and because the cask materials are less expensive than those used by other manufacturers. One B&W source said a B&W bid to Vepco could run as low as $650,000 for a cask and that the figure is "less expensive than anything I've seen so far." The crux, however, for B&W, according to a source, is that the vendor must "win an order first" before it goes ahead and actually begins prototype fabrication. B&W predicts that it could deliver a cask to Vepco within 18 months after receiving an order. *—Michael Ganley, New York*

RIO ALGOM REPORTS HIGHER EARNINGS FOR FIRST HALF OF 1984

With its Stanleigh mine now operating at its full 7,700 tons-per-day capacity on a profitable, long-term contract with Ontario Hydro and with a "more favorable sales contract mix" for output of its Panel and Quirke mines at Elliot Lake, Rio Algom Ltd. said its uranium revenue and earnings were higher in the first half of 1984 than in the same period a year earlier. The uranium earnings offset a net loss in Rio Algom's copper, silver and molybdenum production. The company reported (Cdn) $571-million revenue for the first half of this year, up 49% over the first half of 1983. Consolidated net earnings (after taxes and minority interests) were $36.6-million, compared with $25.2-million in the first six months of 1983.

NFS THREATENED WITH $100,000 NRC FINE OVER SECURITY PROBLEMS AT FUEL PLANT

NRC is proposing a $100,000 fine against Nuclear Fuel Services Inc. for allegedly allowing "degradations" of security barriers at its nuclear fuel fabrication plant in Erwin, Tenn. NRC released no details of the alleged violation since the top-secret installation is a key step in the manufacture of fuel for U.S. Navy nuclear submarines, but said there were "multiple examples" of the violation, in which access was allegedly not properly restricted at areas where radioactive materials are handled. "The NRC is concerned that the management and administrative control system at NFS failed to promptly detect and correct these problems," said NRC Region II Administrator James O'Reilly. The company, which is owned by Getty Oil, has not decided on its response, according to a spokesman. It has 30 days to give NRC a formal reply.

The alleged violations do not endanger a settlement reached last year by NRC, DOE and the Natural Resources Defense Council on standards to be applied to the Erwin facility for tracking radioactive material (NF, 23 May '83, 11). Because of the complexities of the manufacturing process, NRC had allowed a greater margin of error in accounting for materials than at other fabrication facilities. NRC had ordered stricter physical security instead. NRDC challenged that trade-off, and in 1983 DOE agreed that the NFS plant would phase in stricter accounting standards over a two-year period. An NRDC source said NFS is in conformance with the settlement and the alleged violations do not involve items in the settlement. The source said the allegations only indicate that operations are "sloppy."

BNFL BEGINS OPERATING PLANT FOR FABRICATING PWR FUEL

Emphasizing its speculative nature, British Nuclear Fuels PLC (BNFL) last week announced the start of operations at its 200 metric tons/year PWR fuel canning and assembly plant.

The fabrication facility at BNFL's Springfields site near Preston was built under license from the Westinghouse Corp. Eight fuel assemblies from the plant already have been delivered to the Tennessee Valley Authority's Sequoyah plant for a demonstration later this year.

BNFL hopes the plant can be used to fabricate fuel for the Central Electricity Generating Board's planned Sizewell B PWR, but BNFL stressed that the plant is speculative and that "the CEGB is not committed, beyond the initial load, to obtaining PWR fuel from the Springfields plant if the outcome of the Sizewell inquiry is favorable to them. Though there is worldwide overcapacity at present for PWR fuel, it is expected that there will be numerous export market opportunities as new reactors come on stream," the company said. Earlier this year, a BNFL official said marketing efforts were under way and that some bids had been made through Westinghouse (NF, 21 May, 3).

KERR-McGEE REPORTS LOSS OF $3.2-MILLION ON NUCLEAR OPERATIONS IN SECOND QUARTER

Kerr-McGee reported no deliveries of uranium in the second quarter of this year and deliveries for all of the first six months of the year total only 145,000 lb. A spokesman for Kerr-McGee attributed the company's decline in deliveries to the general malaise affecting U.S. uranium producers and said the figure for the second quarter resulted because "no deliveries were scheduled for the second quarter." Other sources said several Kerr-McGee customers have in recent months deferred U308 deliveries until next year, prompting the decline in the second quarter.

"It doesn't surprise me one bit," one source said. "Contracts are running out and U.S. producers in general aren't getting any new contracts. Utilities are going offshore instead." The problem, the source said, is affecting all U.S producers and even large producers like Kerr-McGee are not immune. Another industry source also noted that it is not unusual for producers to show seesaw delivery amounts in different quarters as utilities defer deliveries from one quarter to the next. A Kerr-McGee spokesman noted, for example, that while the second quarter deliveries were zero, the company still has contracts calling for deliveries of 10-million lb of U308 over the next six years.

U308 deliveries for the second quarter of 1983 totalled 740,000 lb. The total for the first six months of 1983 were 1.170-million lb. Deliveries of UF6 totalled 422,000 kg of U as UF6 in the second quarter this year compared with 1.453-million kg in the same period last year. For the first six months of 1984, UF6 deliveries were 832,000 kg of U as UF6. That compares with deliveries of 2.32-million kg for the first six months of 1983.

Losses on the uranium sales totalled $3.22-million in the second quarter and $5.4-million for the first six months of of prices negotiated under long-term prices.

One informed source said that prices under long-term contracts for 1984 deliveries are all above $30/lb and that Nufcor "wouidn't contemplate anything under $30." For current sales, however, he said, the willingness to sell under that level "depends on circumstances. If it's for 1,000 tons at $27.50, I'll talk business. If it's 100 tons at $22.50 – look, I'm sorry. . . . There is an eagerness to sell, but we must weigh the consequences of selling at spot market."

Such is the pressure to maintain higher prices under long-term contracts that Nufcor recently agreed to excise quantities scheduled for 1984 delivery under a contract with a West German utility, rather than agree to the utility's demand for a price well below $30/lb. In cases where there is a choice of deferring deliveries or lowering the price, the source said, "I think our preference would be to stretch the contract because our concern is always with the long-term viability of the industry."

In the case of the West German contract, which runs through 1995, and under which about 200 tonnes were scheduled for delivery next year, sources said the agreement to excise the amount was allowed under terms of the contract and that the utility probably didn't want the amount. In any case, there was "no acrimony" about the decision not to deliver, according to the first source.

Nufcor, meanwhile, has gone back to allocating new contracts on a shared basis, depending on what prices and amounts producers offer, although it will still act as an agent for contracts directly between utilities and mines if that's desired, according to the Nufcor official. The so-called "back-to-back contracts" were prevalent in the late '70s when demand was high and producers no longer wanted to guarantee each other's production, he said, but "because times are lean we've gone back to allocating contracts."

Producers are not told how the contract is allocated "until after the event," he said, and only those whose prices are at or below the price Nufcor achieves in a contract are given a piece of it. The organization asks for information on price and quantities from its members "every time we make a sale of more than 100 tons or every six months," he said.

– Stephanie Cooke, Johannesburg

CANADIAN HIGH COURT UPHOLDS EXEMPTION OF CROWN CORPORATIONS FROM CARTEL CASE

The Supreme Court of Canada has upheld a lower court ruling that the defunct Uranium Canada and Eldorado Nuclear Limited (now Eldorado Resources) are exempt from prosecution in the Canadian domestic uranium cartel case.

The decision by the seven-member Supreme Court was delivered Dec. 15 with two justices dissenting in part on constitutional grounds. Government lawyers have been waiting 20 months for the decision before proceeding in a Toronto criminal court against four private sector Canadian uranium producers. They are Denison Mines Limited, Gulf Minerals Canada Limited, Rio Algom Limited and Uranerz Canada Ltd.

These four are to appear in the provincial criminal court in Toronto on Dec. 22. Judge John P. Kerr is scheduled to set a trial date unless the defendant company lawyers move to get the charges thrown out on grounds that the long delay – more than two years since the charges were laid – violates the Canadian Charter of Rights (NF, 5 Dec., 5).

In July 1981 the Department of Corporate & Consumers Affairs charged the six uranium companies with violating the Combines investigation Act by conspiring to restrict uranium sales in Canada during the 1970-78 period. At that time Robert Bertrand, the man who headed the anti-combines probe against the uranium producers, predicted the case could take 10 years to conclude.

THE KEY LAKE MINE HAS PRODUCED 750,000 LBS OF U308 since its startup Oct. 3, the Key Lake Mining Corp. said earlier this month. Operating at capacity, the mine is expected to produce 12-million lbs/yr, or roughly 12% of the Western world's total output. Key Lake consists of three separate deposits, all high grade and close enough to the surface to be mined by open-pit methods. The company reports these updated reserve figures (as of Dec. 7):

Deposit	Tons of ore	Grade	Millions of lbs U3O8
Gaertner	895,000	3.30%	59.1
Dellmann	2,333,500	2.49%	116.2
Cobble Ore	652,000	0.54%	7.1

SERU ANNOUNCES 125-MILLION POUND DEPOSIT WITH 'VERY HIGH' GRADES NEAR CIGAR LAKE

"A very high grade deposit" expected to exceed 125-million pounds of uranium oxide has been established by SERU Nucleaire Canada Limited, operator of the Waterbury Lake joint venture about 125 kilometers (75 miles) northeast of Key Lake, Saskatchewan. The preliminary estimate is based on 1983 drillings over 10 acres immediately southeast of Cigar Lake in the Waterbury Lake area.

"Given the reserves that have been discovered in this particular part of the Waterbury Lake area and the size of it, the most important thing is to prove up to the level of these reserves. Secondly, drilling in 1984 will be directed toward increasing the level of these reserves and we have a lot of confidence in doing that," Roy E. Lloyd, president of Saskatchewan Mining Development Corp. (SMDC), 50.75% partner in the joint venture, told NuclearFuel. SERU Nucleaire, a subsidiary of France's Cogema, has a 33.63% interest and is the operator. Idemitsu Uranium Exploration Canada and Reserve Oil & Minerals Corp. hold 11.88% and 3.75% respectively.

Announcing the reserves based on the "first evaluation" of 65 holes drilled this year, SERU Nucleaire president Daniel Faure said most of the geological interpretation of the season's drilling was complete and chemical assays had been received. "However, due to the very high grade encountered, radiometric data should be used with great care. Moreover, some holes have a great statistical weight, and determination of their area of influence will be critical," he cautioned.

Faure noted that these reserves are within a band less than 100 meters wide over approximately the eastern third of a 1.7 km (5,600 feet) area. Work is yet to be done on the western 1,100 meters (3,600 feet) of the mineralized structure, which "is still open ended," he said. "Promising results were also obtained (in 1983) on a second area known as Tibia Lake a thousand meters (3,300 feet) north of the Cigar Lake structure," he said.

The project is between the 320,000-acre McArthur River project immediately to the southwest and 382,000-acre Dawn in the short to medium term, Gamble added.

Jim Strong, executive director of the Australian Mining Industry Council, also said it was too early to comment on the proposed levy. However, he pointed out that if the industry were to contribute to research on waste disposal it would need an economic base upon which to do so. In other words, he said, it would require continued permission to export uranium.

Further, Strong said, the implication should not be drawn that Australia is doing nothing at present in the field of waste disposal research. The Synroc project, funded by the federal government through the Australian Atomic Energy Commission, has aroused international interest, he said, and it is on this project that any future funding should concentrate.

CANADIAN TRADE REVIEW IS BULLISH ON U3O8 BUT ADVISES SENSITIVITY TO U.S. INTERESTS

Canadian trade officials are bullish on the long-term prospects for uranium exports, particularly to the U.S., but warn policymakers to keep U.S. "sensitivities" in mind to avoid future import restrictions.

A major trade policy review recently issued by International Trade Minister Gerald Regan says the current uranium surplus will have a "depressing effect on prices and on investment in exploration and development . . . at least through the mid-1990s," but that a possible shortfall could occur beyond 1990 unless new supplies are found.

"Over the long term, nuclear power is still expected to contribute a significant portion of the world's energy supply," the review says. "Given these prospects and the probability of significant new uranium discoveries . . . the Canadian uranium industry has the potential to enhance its position in world markets."

The scheduled phaseout of U.S. import restrictions by the end of the year is another reason for optimism, the report says, but it cautions that an abnormally high import volume in the U.S. will trigger an investigation into the need for further restrictions.

In this regard, Canadian trade policy architects should be sensitive to the possible adverse reaction of trading partners to policy initiatives, the report says. "This concern has been sharpened by the protectionist mood in Congress and by our continued vulnerability to changes in U.S. economic fortunes. It is important, therefore, that in future, particular attention be paid, in devising and presenting national policies, to ensure (to name only one) that the U.S. interest and sensitivities are adequately addressed." Otherwise, there is a danger that "economic ties will wither on the vine" and that Canada will undermine its "earned reputation for reliability and steadfastness."

On the other hand, there is a need to recognize that Canada "cannot pursue a one-dimensional foreign policy and that, from time to time, serious security and other considerations may assert their own primacy," the report says.

Regan says that given the dependence of Canada on the U.S. market – $58-billion in U.S.-bound exports last year represented 67% of all exports – it is impossible "not to have some irritants from time to time." However, he stresses the need for better overall management of economic relations between the two countries.

The latest estimate of proven and potential reserves in Canada, compiled in 1981, is 406,000 tonnes of uranium, nearly double the 1974 figure, according to the report. (Data for 1982 is not expected to be available from the Dept. of Energy, Mines & Resources until at least next month.) Primary production in 1981 was 7,000 tonnes.

Domestic uranium requirements are about 62,000 tonnes, based on estimated nuclear generating capacity either operating now or committed for operation by 1991 of 15.1 Gw. Annual requirements, including first cores for future reactors, are projected to grow from 1,100 tonnes in 1981 to between 2,200 and 2,400 tonnes in 1991.

"Export demand, based upon existing commitments, will be much larger," the review says. Between Sept. 5, 1974 and the end of 1981, contracts totaling some 79,700 tonnes were approved. That reflected scheduled deliveries under 62 contracts, 31 of which still are active. At the end of 1981, remaining export commitments were 60,500 tonnes with the major markets being the U.S., Japan, Britain and West Germany.

– Ken Pole, Ottawa

HARMONY QUESTIONS FUTURE AS U3O8 SUPPLIER

The Harmony Gold Mining Co. in South Africa's Orange Free State, expects to continue profitable uranium operations in the year ending June 1984 but the outlook beyond that is uncertain, says Democles Watt, chairman.

"Unless selling prices improve considerably, a tailing-off in profitability is forecast and the company will have to reassess its role as a uranium producer," he adds.

Harmony's revenue from sales of uranium, pyrite and sulfuric acid amounted to 59-million rands (about $67-million at current exchange rates) in the year ending with June 1983, compared to 44-million rands in the previous year. The sales amounted to 10.6% of total revenue of about 560-million rands. Harmony produced 630 tonnes of U3O8 in the year, compared to 585 tonnes the previous year.

Noting the rise in the spot price, Watt comments that "some consumers have reportedly commenced a process of building up inventories in anticipation of a major price rise in the long term. There has however, been no real increase in consumption, and current forecasts are that production will remain in excess of consumption for many years.

"It is therefore certain that price trends in the immediate future will be dictated primarily by financial considerations and will be very sensitive to changes in interest rates in the U.S."

TEST SHOWS NRC FUEL-TEMPERATURE LIMITS HAVE BIGGER SAFETY MARGIN THAN THOUGHT

An experiment that researchers feared could burst fuel cladding showed instead that cladding heated much less than predicted, giving experts more confidence that current power limits for reactor cores are extremely conservative and could be relaxed.

The experiment, run for NRC last week at DOE's Loss-of-Fluid Test (Loft) facility in Idaho, simulated a loss-of-coolant accident (loca) and a simultaneous loss of offsite power. The entire, five-foot-high core was uncovered during the test and fuel cladding temperature was measured. Re-offer of $2.50/share (NF, 12 Sept., 3). Although Pancontinental has not yet announced whether it will sell its 9.4% stake in Robe, it stands to make a profit of roughly $2.5-million if it does. The company is thought likely to sell because, like Peko, it was interested in total control of Robe.

HAWKE SEEN BUYING TIME TO GATHER SUPPORT IN DELAYING URANIUM POLICY DISCUSSIONS

Australia's Labor government has postponed its long-awaited uranium policy discussions by another month. In a report to Parliament's Labor Caucus last week, Prime Minister Robert Hawke said that Foreign Affairs Minister Bill Hayden and Treasurer Paul Keating would be away from Australia for much of October and discussions on uranium policy would not be appropriate in their absence. However, according to some observers, the delay is to allow Hawke to gather sufficient support within the caucus to carry his publicly stated position in favor of new contracts for existing mines and development of Roxby Downs (NF, 12 Sept., 3).

In response to opposition criticism of the delay, Hawke reaffirmed his "belief" that Roxby Downs will be developed. He said a paper would be prepared and would be considered by the Labor Party within the next few weeks. He believed the government would make a decision before the end of October. Technically, the caucus has great power in government decision-making, but observers expect the uranium issue to be settled in behind-the-scenes lobbying before it is put to a caucus vote. At this stage, analysts believe the Hawke view is likely to prevail.

According to consumer advocate Ralph Nader, who met Hawke the day after the delay was announced, "it was quite clear he (Hawke) has made up his mind" on uranium. Nader said Hawke listed three points in defense of uranium export – it brings investment into Australia, it creates jobs, and it allows Australia to be a responsible participant in the nuclear fuel cycle. – *Sheila Haydon, Melbourne*

CANADA 'REAFFIRMS' POLICIES ON U3O8 PRICE AND UPGRADING – WITH ROOM FOR INTERPRETATION

The Canadian government has announced a "reaffirmation" of its upgrading and pricing policies with respect to uranium exports. As in the past, both leave room for interpretation, although the pricing policy appears to be more flexible in not specifically requiring floor prices or annual negotiations as was previously the case. Instead that policy calls for floor prices or "similar mechanisms" designed to protect "investment and employment in uranium production facilities."

The requirement for converting U3O8 in Canada is essentially the same. That requirement remains worrisome to producers and non-Canadian converters, although one producer says he's confident "it will work its way out."

The policy "provides for the regulating agencies to consider requests for exemptions from the further processing provision if the Canadian facilities do not have the capacity or if they are not generally competitive in the world scene," said Robert Morrison, director general of the Department of Energy, Mines & Resources' uranium & nuclear energy branch. Speaking at the Fourth Pacific Basin conference in Vancouver this month, Morrison said that exemptions could be granted for other reasons but only "in the most exceptional circumstances."

With respect to contract terms, he said, the "ministers have decided to reaffirm the requirement for a floor price or similar mechanisms that would protect investment and employment in uranium production facilities. At the same time, the terms of sale should equitably balance benefits and risks and should generally be in accord with those being obtained by Canadian and international producers for uranium under contracts for similar duration.

"Uranium export contracts will continue to be reviewed by the Uranium Exports Review Panel to ensure that they are consistent with Canada's policy. Acceptance by ministers of the contract terms and conditions is a necessary step prior to the consideration by the regulating agencies of applications for export permits. The panel will make every effort to ensure that the contract review is as expeditious as possible," Morrison said.

Previously, the government required provisions in export contracts for an escalating floor price that would protect investment in production facilities, and for annual price negotiations. The policy was last reviewed in 1974. Taking current "market realities" into account, an informed source said, the idea now is "to provide greater security to companies" and "to move away from government intervention or even the appearance of intervention."

At the same time, however, it appears that the export panel will feel some pressure to protect the higher-cost Elliot Lake producers. Morrison and other officials have repeatedly stressed that the policy must embrace the needs of all Canadian producers, and informed sources say that Elliot Lake costs could be expected to "condition" contract reviews. Although that could theoretically lead to rejection of a contract on the basis that the price was too low, sources say it is unlikely in today's market.

As for the upgrading policy, a Canadian producer said he "would hope the Canadian government would interpret it in a rational fashion." If a Canadian producer lost business because of it, the Canadian conversion business would not be hurt or helped, he said, but the uranium business would be hurt. It would be "damaging to Canada," he said.

A U.S. converter also expressed concern, noting that Canada is soon expected to be providing about a quarter of the Western world's uranium needs. Because of that, he said he hoped to see the Australian government supporting further uranium development and a stronger Australian presence in the market.

In addition to policies on upgrading and pricing, the government also has limited the length of contracts and required recall provisions to ensure enough domestic supply. Because of the current oversupply, however, the government extended the limit on export contracts from 10 to 15 years, and to 30 years for uranium associated with Candu reactor sales.

– *Stephanie Cooke, Vancouver*

JOHN VALLANCE HAS JOINED THE COLORADO NUCLEAR CORP, as president, succeeding Don deHalas who remains as chairman of the board. Vallance was a senior consultant with Pickard, Lowe & Garrick for the past 16 years, providing consulting services on the nuclear fuel cycle and coauthoring with deHalas an annual report on the uranium market.

NuclearFuel

A biweekly report from the editors of Nucleonics Week

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SWEDEN'S ERIK SVENKE LOOKS BACK AT 'THE REAL BACK END' *– page 5*

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Swedish decision on reprocessing contracts expected in a year *– page 2*

Northern States seeks 4-million lbs U3O8 *– page 2*

Smud bypasses DOE once again in favor of Agip's excess *– page 3*

URANERZ STRESSES 'VARIETY' in uranium game and figures its a pretty good player *– page 3*

CONOCO SELLS RUBY RANCH FOR $500,000 to Santa Fe Mining *– page 4*

Hawke wins U3O8 vote at ALP caucus *– page 4*

NRC SAYS EPA SHOULD LOWER RADON STANDARDS at active mill tailings sites *– page 7*

TVA approves rod consolidation demonstration at Browns Ferry *– page 10*

Sweden seeks foreign scrutiny of report on once-through cycle *– page 10*

Barnwell seen as IPS candidate *– page 12*

Mexico enters secondary swu market *– page 13*

LONGENECKER REPLACES VOIGT as DOE enrichment chief *– page 14*

Freeport settles U3O8 feud with West German customer *– page 14*

U.S.-SOUTH AFRICA NONPROLIFERATION ACCORD WILL SOON PERMIT FREE SWU PACT TERMINATION

It appears increasingly likely that the U.S. and South Africa will agree on several outstanding nonproliferation related issues in the very near future, thus paving the way for termination of the Electricity Supply Commission of South Africa's enrichment contract with DOE without penalty, according to well-placed sources.

While details of the prospective agreement were not disclosed, the issues involved were identified as establishment of a safeguards framework for the Uranium Enrichment Corp. of South Africa's commercial enrichment plant under construction at the Valindaba nuclear complex near Pretoria, and the willingness of South Africa to act as a nuclear exporter, principally of uranium for the foreseeable future, in accordance with generally accepted international supply guidelines.

"We need something from South Africa to take to Capitol Hill to justify termination," one administration source said earlier this year. The State Department, hoping to remove an irritant in U.S.-South African relations, has long wanted the Escom contract to be suspended or terminated without the South African utility having to pay close to $20-million in penalties.

DOE, after being asked by the State Department, recently waived the advanced feed delivery requirements for FY-83 in the enrichment contract held by Escom. DOE informed Escom that instead of delivering feed 90 days in advance of receiving delivery of enriched uranium, the South African utility could deliver feed any time up to the delivery by DOE of enriched product to Escom's account. Escom is scheduled to take delivery of about 24,240 kg of enriched uranium from DOE before the end of the fiscal year, Sept. 30. The contract calls for DOE to supply 117,734 swu for a reload for Koeberg-1.

In 1981, DOE suspended its advanced feed delivery requirement for all customers, although the action was primarily for the benefit of South Africa (NW, 4 June '81, 1). In that year, Escom did deliver feed to DOE, and subsequently sold the enriched material to U.S. utilities. Those utilities, as part of the de-enrichment deal with Escom, delivered enough natural feed to Escom's account with DOE to cover delivery requirements for 1982. So far, Escom, according to sources, has not sold any of that second delivery of enriched uranium. – *Michael Knapik and Rob Laufer, Washington*

COGEMA LANDS SECOND U.S. CUSTOMER FOR UF6

Wisconsin Public Service signed a contract with Cogema Inc. for delivery of enriched uranium in the late 1980s, becoming the second U.S. utility to do so, informed sources say. Like Cogema's

NuclearFuel

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$ucce$$ or Exce$$

Buyers and sellers are told they may be getting too greedy for their own good – a report from the AIF/Foratom conference in Geneva, by Stephanie Cooke and Ann MacLachlan, starts on page 8

OTHER HIGHLIGHTS

Appropriations Committee would speed AIS and slow GCEP – *page 2*

ERA AND QUEENSLAND GET OKAYS for U.S. marketing efforts – *page 3*

AN ABOUT-FACE ON TAILINGS by NRC appears likely if a staff majority has its way – *page 4*

UNC wins a $50-million judgment against the insurer of its Church Rock complex – *page 5*

TAMPERING WITH THE NNPA would be "seriously injurious" to the U.S. nonproliferation effort, the Administration tells Congress – *page 11*

Transport rules proliferate as states shrug off federal preemption – *page 12*

Council faults U.S. waste research – *page 14*

ICC would hold German utility to Freeport U3O8 contract – *page 14*

France stays FBR reprocessing course – *page 14*

DOE high-burnup program gets a boost – *page 16*

DOE SUSPECTS BREACH OF SWU CONTRACT IN SCE&G PURCHASE FROM AGIP NUCLEARE

The Department of Energy thinks South Carolina Electric & Gas breached its requirements contract by knowingly underestimating its 1983 swu needs. Swu obtained elsewhere would subject SCE&G to termination charges, it says. The utility agreed to buy 100,000 swu from Agip Nucleare for delivery in FY-83 (NF, 9 May, 1) just about a month after telling DOE its FY-83 needs would be zero.

If DOE suspicions are borne out, it could levy termination charges of $59.94 for each swu that SCE&G should have taken under its DOE contract.

SCE&G denies that it did anything that could lead DOE to determine that the utility breached its enrichment contract and would fight any attempt by DOE to levy termination charges, an official at the utility says.

In a letter to DOE dated Dec. 30, 1982, SCE&G said it was submitting a revised estimate of its swu requirements for its Summer unit. The letter says that the revised estimates of swu requirements were based on, among other things, a projected operating capacity factor for Summer of 50% for the period 1983-87. SCE&G' officials say that at the time they also expected an NRC-mandated steam generator repair to begin in the fall of 1983 and to last about five months.

DOE telephoned SCE&G Jan. 14 to say the department had agreed to the modification and that they should expect a formal document to sign in the near future. DOE sent SCE&G the modification agreement in mid-March. On March 30, SCE&G officials signed it. On April 6, DOE officials signed it. On May 5, SCE&G signed a contract with Agip for swu deliveries in FY-83. (Before signing the contract with Agip, SCE&G officials said they tried to buy DOE-origin swu on the secondary market but couldn't because DOE could not boost the enrichment assay of the material to meet SCE&G specifications without 180 days' notice. SCE&G officials said they needed the material before then.)

In a letter to SCE&G dated May 12, DOE says, "As you are aware, or should be aware, the undertaking of South Carolina Electric & Gas Co. under its requirements contract is to obtain the separative work requirements of the covered facility under the contract, except to the extent otherwise permitted thereunder. DOE's obligation is to furnish the actual requirements of the covered facility, subject to an agreed-upon ceiling. To implement this arrangement, the parties agree upon an estimated delivery schedule which sets forth the estimated annual requirements of the covered facility for the term of the contract. Implicit in this process is the obligation

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HIGHLIGHTS

DOE GIVES WPPSS A BREAK on swu deliveries not because it is legally bound to but because it "provided the shovel" for WPPSS to dig the hole it's in *– page 4*

Leibstadt loses bid to assign DOE swu *– page 4*

DOE names task force to help improve its position in swu markets *– page 5*

Cogema and Taipower sign 'flexible' enriched-uranium contract *– page 5*

Everest buys Exxon's Highland project *– page 8*

Dawn Mining posts a loss for 1982 *– page 8*

Ranchers buys two mining companies and negotiates for more uranium property *– page 9*

U.S. production is down 30% for '82 *– page 10*

Bid to derail Koongarra talks fails *– page 10*

UTILITIES WIN A ROUND ON RE-RACKING but NRC will hold another in August *– page 11*

NFS Erwin plant will return to NRC 'standards' in two years *– page 12*

CSSN may have final vote on how France treats alpha wastes *– page 13*

Europeans eye GE systems for inspecting mixed-oxide pellets *– page 15*

DOE MAY SEEK VOLUNTARY LIMITS ON SALES OF FOREIGN SWU IN U.S.

DOE, concerned that it may be opening a "Pandora's box" by filing a formal antidumping petition with the Commerce Department and the International Trade Commission, is now considering first approaching foreign companies with excess swu to see if agreements can be reached to have them voluntarily limit the amount of material sold to U.S. utilities, according to an informed source. The Euratom Supply Agency has offered to facilitate such discussions with the Italian suppliers Enel and Agip Nucleare – an offer which DOE has welcomed, sources say.

Sources say that DOE, which could have filed a petition several weeks ago, has been holding back because of concerns that the petition may somehow hurt DOE's efforts to sign future enrichment contracts with foreign utilities; might provoke retaliatory actions by foreign governments against U.S. products; and might tie the department up in lawsuits even if it were to win its antidumping case.

– Michael Knapik, Washington

SMDC PROVIDES UP TO 8% OFF NUEXCO PRICE AND $35/lb CEILING IN YANKEE U3O8 DEAL

The Saskatchewan Mining Development Corp. set a $35 per pound maximum price for uranium under a long-term contract with Vermont Yankee signed in April 1982, NuclearFuel has learned. Only two months earlier the utility agreed to a $55/lb ceiling in a deal with Energy Fuels Nuclear. Both ceilings can be adjusted upward to account for inflation. Actual prices paid under the deals are related to Nuexco values at the time of delivery. But where Energy Fuels offered only a 2% discount off its Nuexco-related price, SMDC offered as much as 8%.

The contracts were negotiated on the utility side by the Yankee Atomic Electric Co. as part of an effort to fill unmet requirements through the 1980s of 7- to 8-million lbs U3O8 for three of the Yankee group operating nuclear units and Public Service of New Hampshire's Seabrook plant, which is still under construction. Sources say the contracts with Vermont Yankee could be expected to be similar if not identical – except for delivery amounts – to contracts with the same producers signed by the other Yankee utilities.

In all, SMDC agreed to supply the group with 2.2-million lbs (NF, 6 Dec. '82, 2). The total amount from Energy Fuels has not been disclosed. Under the SMDC contract with Vermont Yankee, a total of 300,000 lbs is scheduled for delivery from 1985 through 1990. The Energy Fuels deal calls for delivery of 900,000 lbs in the period 1982-90.

The SMDC contract allows the buyer to adjust annual quanti-

and delivery of 15-million lbs U3O8 by UNC at prices well below UNC's then mining cost.

The high court previously refused to review a New Mexico Supreme Court decision upholding a 1978 default judgment against GAT. UNC at the time valued the award at approximately $300,000 – representing the difference between an $8.3-million damages award and offsets of about $8-million, of which about $6-million represented an advance payment by GAT against future deliveries.

Whether GAT's parent Gulf Oil opts to take the case any further is unclear. As a UNC official, referring to Gulf, put it, "they've been pretty resourceful." He said Gulf could possibly request a rehearing of the Supreme Court's decision. Gulf's lead attorney was not available for comment.

As far as Cunningham is concerned the case is over. "This ruling is significant because it finally lays to rest the spurious arbitration issue with which GAT has been harassing us," he said. "Moreover, it at last completes litigation that has extended over seven-and-one-half years and once again confirms that GAT has deliberately disregarded the judgments and orders of the New Mexico courts for some five years."

SMUD DIRECTORS APPROVE OF EURODIF SWU FROM ITALY'S AGIP NUCLEARE AT $115 EACH

The board of directors of the Sacramento Municipal Utility District has approved Smud's purchase of 93,586.3 swu from Agip Nucleare at $115/swu (NF, 14 March, 1). The deal, which entailed termination of 117,130.2 swu under its DOE requirements contract at a cost of $29.97/swu, will save Smud $1,344,894.

Agip will supply Smud with material from its enriched uranium stockpile, delivering it in September to Babcock & Wilcox, where it will be stored by Agip until fabrication begins in April 1984. Smud will deliver 172,687.6 kilograms of natural uranium (as UF6) to Agip. Because Smud is taking the swu at a 0.3% tails assay, compared to the 0.2% assay it would have been held to by its DOE contract, it will be delivering 29,117.6 kg more UF6, at $66.50/kg, than it would have under the DOE contract. So while the total cost of taking the DOE swu would have been $17,551,960, with termination charges and additional feed Smud will still pay only $16,207,066 for enrichment of its next Rancho Seco reload.

ASLAB TO RULE IF FUEL POOL SAFETY SYSTEM VOIDS NEED FOR LOSS OF COOLANT ANALYSIS

An Atomic Safety & Licensing Appeal Board will have to decide if Consumers Power can take credit for a remotely operated water makeup line to prevent criticality as part of application for expansion of the spent fuel pool at the Big Rock Point nuclear plant near Charlevoix, Mich.

A licensing board ruled last October, in a partial decision, that Consumers Power must submit within 60 days an analysis of the effect on criticality in the pool of the loss of all or almost all of the water in the pool as part of its application to add three new fuel racks to the pool. Consumers is arguing that the licensing board should have been bound by NRC's Criterion 62, which says that one of two standards must be used for limiting criticality: either a geometrically safe configuration of the pool, or some sort of physical system. The water makeup line, which provides a separate system for restoring lost coolant to the pool, is such a physical system and should be recognized as such, the utility said. If it were, then the report that the licensing board wants is unnecessary, the utility argued.

NRC staff supports Consumers Power's contention that the additional analysis isn't necessary, although its argument is slightly different from the utility's and doesn't go as far. The staff believes that Consumers meets Criterion 61, which requires a utility to provide for safeguards against a loss of coolant accident.

Criterion 61 precludes a significant loss of coolant inventory and therefore the utility is being asked to postulate conditions which NRC wouldn't allow, staff attorney Richard Bochmann argued. He pointed out that the licensing board chose to apply staff guidelines in reviewing Consumers Powers' application, but did so selectively, allowing the utility, for example, to avoid discussion of the possibility of a severe metal-water reaction under reduced coolant conditions because of existence of the makeup line.

The question of the makeup line's acceptance as a physical system for preventing criticality hasn't been discussed in a public hearing by the licensing board and thus it hasn't been officially approved for that purpose, Bochmann said, but he maintained that the extra analysis the board requested isn't necessary. If the makeup line is found to be inadeqaute, the staff would require some other form of protection against loss of coolant if the fuel pool were to be operated, he pointed out.

Herbert Semmel, attorney for intervenors Christa-Maria, Jim Mills and Joanne Bier, argued that the utility shouldn't be allowed to rely on an engineered safety facility such as the makeup line because the spent fuel pool and the safeguard components at Big Rock Point are within the containment area of the plant. In the case of an accident such as occurred at Three Mile Island-2, the pool and the components wouldn't be accessible and couldn't be monitored. If anything went wrong, said John O'Neill, an attorney representing himself, significant problems could occur when the water level dropped as low as four feet below the full level, which he said could occur within five and a half days. It would take 25 days for all the coolant to boil out, he argued, during which time the heat level could damage the fuel rods themselves. One of the appeal board judges asked if the loss of all water in the pool wouldn't stop criticality, and O'Neill acknowledged that it probably would, but he added that there could be mist conditions in the pool which might be optimal for criticality.

O'Neill argued that the burden of proof is on the utility to show why the physical system safeguard is better than a geometric configuration to prevent criticality and that NRC regulations say the board must examine the possiblity of criticality under all conditions. In addition, unlike other engineered safety devices, O'Neill said, there is no remedy if the makeup line fails under the circumstances the intervenors have postulated, because there would be no access to the containment.

A spokesman for Consumers Power said if the appeal board upholds the order for the analysis, the utility will then have 60 days from the date of that order to comply. If the appeal board rules that the analysis is not needed, the utility will still have several other points of contention on its application for the pool expansion to deal with before the expansion can be approved. – *Frances Seghers, Washington*

THE NUCLEAR SERVICES BUSINESS – MAY 18-20, WASHINGTON, D.C.

The first conference devoted exclusively to the nuclear services business will be sponsored May 18-20, 1983 in Washington, D.C. by Nucleonics Week, NuclearFuel and Inside N.R.C. Mark the dates on your calendar now if you and other members of your organization will be likely to participate in this unique event. As with the Nuclear Commerce in the '80s conference sponsored by the McGraw-Hill nuclear publications last April, the nuclear services conference will be geared to provide the most incisive information possible to an audience small enough to foster a lively exchange. Details will be announced shortly; meanwhile, make a note now to reserve the dates.

La Hague. The contracts linked to the new UP3 plant – construction of which is being financed entirely with advance payments from foreign customers – are so-called "cooperative contracts," meaning basically that Cogema can recover excess costs in reprocessing fees. But, cautioned one Cogema customer, a fee hike would have to be debated between Cogema and its customers.

If French law ends up specifying more sophisticated separation of wastes into alpha and non-alpha wastes before conditioning, the extra cost of that could be billed to foreign customers as well, since foreign companies must agree to waste forms specified by the French for return to country of origin.

Cogema customers contacted by NuclearFuel said that Cogema had not told them about details of the Castaing report during their latest meeting just before Christmas. But one source said the French company had assured them the report presented "no problems" for the continuation of the current reprocessing program.

The report is likely to generate some controversy internationally with its suggestion that reprocessing is necessary for proper waste management. The Swedes, for example, disagree completely with this view; one Swedish source said that separation of long-lived elements is not only unnecessary but also "worse than reprocessing" in terms of cost and complexity. Sweden has adopted a policy of long-term spent fuel storage.

As to what the French government will do with the Castaing group's recommendations, this should become clearer in mid-January. But observers note that the interim storage option would cost less than expanding capacity to handle all French spent fuel at La Hague. – *Ann MacLachlan, Paris*

SOVIETS WOULD STRETCH COGEMA DELIVERIES BUT ONLY IF FRENCH TAKE MORE SWU

France has begun discussions with Techsnabexport of the Soviet Union aimed at renegotiating the terms of Cogema's contract to buy Soviet separative work. A high-level French delegation was in Moscow just before Christmas to begin the discussions, which a Cogema official said consisted at this point of the presentation of the two parties' points of view, which are far apart.

The contract involves delivery of a total of 15-million swu from 1974 to 1990. Some 9-million swu have aready been delivered. According to sources in Paris, the current negotiations aim at stretching out in time deliveries of the remaining 6-million swu so as to help alleviate the serious undercapacity problems at France's own Eurodif plant.

However, while the Soviets and French agree on the general principle, they differ on how the contract should be revised. The French are said to be pushing for not only postponement but also reduction of the total amount of separative work taken, as is the case with their renegotiated U.S. DOE contracts. The Russians, on the other hand, want the stretchout (or a two-year suspension) to be compensated by greater quantities during later years – for example, a total of 8- to 9-million swu to the year 2000 or thereafter, instead of the current 6-million to 1990.

A Cogema official said that the discussions were extremely preliminary and that "we are far" from a conclusion satisfactory to both parties. The renegotiation in any case would not affect deliveries in 1983, scheduled to be 700,000 swu.

The Eurodif plant, which is running at only 50-60% capacity, could provide at least 4-million swu per year more than it now produces, and half of that excess is Cogema's direct responsibility. France has managed to reduce its deliveries from DOE to a fraction of those from the USSR, but renegotiating the Techsnabexport contract is likely to prove much more difficult, a Cogema official said, due to the absence of a public schedule such as is published by DOE.

COMMONWEALTH EDISON HAS AGREED TO PURCHASE 140,000 SWU of non-U.S. origin from Italy's Enel, according to informed sources. Comm Ed officials refuse to discuss details of the deal, but the utility has recently told DOE that it intends to terminate for FY-83 140,000 swu from two of its requirements contracts. That action, according to DOE, will cost Commonwealth $37.46/swu in termination charges. But that will be more than offset by the savings in buying swu from Enel, sources say. Enel's excess swu comes from both Techsnabexport and Eurodif (NF, 20 Dec. '82, 2).

AGIP HALVES U3O8 EXPLORATION BUDGET FOR SECOND TIME IN AS MANY YEARS

Agip Nucleare, the Italian nuclear fuel company, has halved its uranium operations budget for 1982-86 for the second time since 1981 to help compensate for losses in other operations.

Senior officials said the budget, originally 400-billion lire ($286-million), essentially all for exploration, had been cut in 1981 to 235-billion lire ($168-million). But that wasn't

NuclearFuel

A biweekly report from the editors of Nucleonics Week

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Broker sees $30/swu savings in fuel package deal with Cogema – *page 2*

SMDC announces deal for lifetime supply of U3O8 for Point Lepreau – *page 3*

CFP BECOMES LARGEST PRIVATE U3O8 SUPPLIER in France with acquisition of Dong-Trieu – *page 3*

Cogema sees fuel market doubling by 1995 – *page 4*

ENERGY FUELS SUSPENDS MILL operations at Blanding – *page 4*

Increased technical assistance seen benefitting U.S. safeguards efforts – *page 5*

UNC UNDER FIRE AT CHURCH ROCK – *page 8*

Denison will remap Koongarra if it doesn't get Aboriginal consent – *page 9*

BINGHAM SEES GREATER ZABLOCKI ROLE on nonproliferation but outlook for NNPA changes uncertain – *page 11*

French socialist stance on nuclear drives wedge between its foes – *page 12*

Sweden approves spent fuel shipment to France – *page 13*

ADVANCED CENTRIFUGES SEEN DOUBLING GCEP CAPACITY – *page 14*

WPS BUYS 50,000 SWU FROM ENEL

Wisconsin Public Service has agreed to purchase 50,000 non-DOE swu in FY-83 from the Italian electricity producer, Enel. WPS officials would say only that the deal would result in "reasonably significant savings" and would give "us a cash-flow advantage." WPS terminated over 50,000 FY-83 swu from its DOE requirements contract for its Kewaunee reactor. Because WPS's termination notice was received Dec. 23, 1981 – more than a year in advance of the effective termination date – the utility will pay a termination charge of $25.52 per swu – 20% of the swu price in effect at the time.

– Michael Knapik, Washington

STATE DEPARTMENT EXPECTS DOE TO AGREE TO SUSPEND ESCOM'S ENRICHMENT CONTRACTS

The State Department will soon ask DOE to suspend the two uranium enrichment contracts that DOE has with the Electricity Supply Commission of South Africa. State will argue for suspension on foreign policy grounds – it would remove an obstacle to improved U.S.-South Africa relations; and on commercial grounds – it would remove a source of discount swu which is leading some customers to terminate part of their contracts with DOE. And although DOE officials are noncommittal while awaiting the formal request, State Department officials are confident that DOE will agree.

Escom signed two long-term fixed commitment contracts with the U.S. in 1974 for enriched uranium for its two Koeberg reactors. The first delivery of 261,433 swu was in FY-81; an identical amount was delivered in FY-82. Through FY-92, the contracts call for delivery of a total of over 2-million swu. But because South Africa refuses to accept safeguards on all its nuclear facilities, the U.S. Nuclear Nonproliferation Act of 1978 precludes NRC from issuing an export license for the fuel.

So through Swuco, Escom has sold all of the enriched uranium it took in FY-81 to five U.S. utilities at an undisclosed discount (NF, 20 Dec. '82, 1). As part of those deals, the utilities supplied natural uranium feed to DOE on behalf of Escom, thus satisfying the requirement in the contracts that Escom deliver natural feed to DOE each year. Meanwhile, Escom has been able to obtain some enriched uranium for its Koeberg reactors from private suppliers in Europe and is reportedly looking for more.

The Reagan Administration, meanwhile, has tried to foster "a constructive dialogue" with South Africa on nonproliferation, said a State Department source, even though the Administration does not expect South Africa to accept full-scope safeguards or sign the Nonproliferation Treaty "in the near term." As part of its policy, the Administration is willing to consider export of some nonsensitive, nu-

NuclearFuel

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Cogema and Cluff Lake partners extend U3O8 deal to cover project expansion – *page 5*

ANTITRUST CHARGES SHOULD BE DROPPED against all but Western Nuclear and Phelps Dodge, says court master on WPPSS case – *page 5*

U.S. REJOINS IAEA but U.S. funding remains in question . . . – *page 6*

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India will burn mixed-carbide fuel in test breeder next year – *page 9*

Swedish nuclear official says abandon reprocessing – *page 11*

EDF contemplates its own AFR – *page 11*

Janin sees foreign fabricators taking up to 20% of EDF's reload business – *page 12*

AECB sets 'walkaway' date for Agnew Lake – *page 15*

ALP REFUSES BAIT ON URANIUM ISSUE – *page 16*

GNS has cask orders in Europe but must work harder in U.S. – *page 17*

DOE MOVES GIVE COMMONWEALTH EDISON PAUSE ON PLAN TO PURCHASE 300,000 SWU FROM ENEL

DOE's plans to ask the Commerce Department to impose "antidumping" or countervailing duties on Enel swu purchased by U.S. utilities (NF, 14 Feb., 1) could block a nearly completed deal that would have Commonwealth Edison purchase close to 300,000 swu from the Italian state utility for delivery in FY-83 and -84. The swu would be used for reloads for Quad Cities-1 and Zion-2.

Several weeks ago, Commonwealth asked for bids from U.S. utilities and brokers to supply the swu. Sources say that Swuco, representing Enel, made the most attractive offer. But Commonwealth is apparently reluctant to give final approval to the deal, waiting instead to see what might develop as a result of DOE's effort to discourage the sale of non-DOE swu in the U.S. A Commonwealth official said that the utility has not yet terminated the 300,000 swu from its requirements contracts with DOE and is being "prudent" by closely watching DOE's moves.

According to sources, DOE now plans to file its petitions with the Commerce Department's International Trade Administration and the independent International Trade Commission at the end of March. Sources say the delay in filing the petitions was caused by an intensive review by DOE officials.

Meanwhile, sources say that the West German utility Kernkraftwerk Brunsbuettel GmbH (KKB) is planning to terminate part of its requirements contract with DOE to buy about 43,000 swu for FY-83 from the Public Service Co. of New Hampshire. That deal is an example, according to some European officials, that discounted swu are being sold worldwide and that dumping charges should not be leveled at Enel. – *Michael Knapik, Washington*

DOE HOLDS LINE ON SWU PRICE WITH NEW LOOK AT IMPUTED INTEREST AND STOCKPILE CHARGES

DOE's Feb. 22 announcement that it would not raise swu prices for another year surprised and pleased its customers. Most had been expecting a rise of close to 5% above the current published prices for fixed-commitment customers of $138.65 per swu and for requirements customers of $149.85 per swu. (The provisional ceiling price for requirements customers is $154.60 per swu.) DOE's decision means that the current prices will remain effective until mid-August 1984. If prices are to rise after that, DOE plans to announce the new prices in February 1984.

DOE officials said they were able "to absorb inflation" and not raise prices because of a number of factors. The most important was the decline in the rate that DOE uses to figure imputed interest on the government's investment in plant and equipment, net working

TELECOPY TO: Senator P. Domenici - (202) 224-7371
FROM: Bill Stevens, President - Quivira Mining Company

9/27/84
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Answers to Questions Proposed by Senator Pete V. Domenici

QUESTION: The copper mining industry was recently denied import relief for foreign copper. How much longer can the U.S. uranium mining industry survive if foreign uranium continues to come in at subsidized prices?

ANSWER: Some remanents of the U.S. uranium industry will probably survive the present substantial market penetration by foreign uranium imports, although at a much reduced and hardly "viable" level. To a large extent, the survival of the domestic producers to-date has been due to their backlog of sales commitments, some of which require delivery throughout this decade and into the 1990's. Contracted U.S. delivery commitments of reportedly U.S. origin uranium by domestic suppliers has been reported by the EIA to run approximately 12 million pounds U_3O_8 per year over the next ten years. This is optimistic, since many of these commitments (which includes options) will be reduced, terminated, or met with foreign origin uranium.

The future of the U.S. uranium industry will be dependent on the ability of domestic producers to obtain new sales contracts for their production facilities. In a truly free and competitive market, U.S. producers can effectively compete and win a significant portion of U.S. utility requirements. Subsidization, government financing and backing, dumping, and other predatory practices, however, have made it very difficult, if not impossible, for domestic producers to obtain new sales contracts.

It is unlikely that U.S. utilities would position themselves to be exclusively dependent on foreign imports.

Utilities can be expected to exercise some self-restraint, i.e., they will buy some portion of their requirements from U.S. producers, the percent depending on price differential. However, the difficulty of obtaining new sales, given the importer's current practices, will leave U.S. producers with only twenty to thirty percent of the market, supporting an annual production level of perhaps five to ten million pounds U_3O_8. In fact, this event may have already arrived. Current production is rapidly approaching the ten million pound per year level. This country must decide if we want to depend on insecure foreign supplies for 70% to 80% of U.S. requirements.

QUESTION: DOE this year implemented their new enrichment contract with the provision permitting variable tails, yet with a surcharge. If there was no surcharge, how would this variable tails policy affect U.S. uranium demand?

ANSWER: At the outset, it should be noted that DOE will not allow any choice of tails assay until 1987, and then only in the range of 0.20% and 0.30%. The surcharge has two primary effects, (1) it artificially reduces the demand for uranium, and (2) increases the cost of fuel to the utility customer and the ratepayers because utilities are prohibited from optimizing their enriched uranium costs. Section 4 of the attached report prepared by Nuclear Resources International documents the effects of this surcharge in detail.

The report projects that as a consequence of DOE constraints, reducing the optimum tails assay from approximately 0.29% to 0.24% will cause a 10% decrease in uranium feed requirements.

NRI estimates that the surcharge eliminates roughly half of the market's current unfilled requirements in the 1985-1989 period, and, in the long-term, could reduce uranium feed demand by an average of some 7 million pounds U_3O_8 per year. A similar analysis prepared by Nuexco in their September Monthly Report estimates that uranium demand is decreased 35 million pounds U_3O_8 between now and 1991. This figure is equal to three years of U.S. production at current production levels.

The three specific recommendations made by NRI concerning VTAO should be adopted immediately. These are: (1) remove the surcharge and any provision for a surcharge in the enrichment price, (2) make VTAO immediately available to all customers, and (3) expand the upward limit of VTAO to 0.35%.

QUESTION: According to your testimony, DOE has been selling uranium through the split-tails program. How much has this affected the uranium market - has it directly caused some producers not to proceed with development plans? Would it make any difference if DOE valued their stockpiled pounds of U_3O_8 at $18/lb. rather than $9?

ANSWER: Chapter 3 of the attached NRI report deals with split-tails.

Some 46 million pounds U_3O_8 have been taken from their inventory by DOE to satisfy their split-tails policies, all prior to 1978. This period includes the mid-1970's when DOE enrichment contracts caused a world shortage of U_3O_8 resulting in the highest market prices to date (late 1970's)

In my judgement, it is unlikely that potential producers were forced from the production of U_3O_8 as a result of this action, because of the general uranium shortage that existed at the time. A more reasonable conclusion would be that this activity caused an early cap to be placed on uranium's market price in 1979, effectively reducing the average sales price from perhaps 1975 through 1982.

DOE apparently plans to resume using inventory material for a new split-tails program to begin in 1985,and ultimately consume 53 million pounds U_3O_8.

The use by DOE of $9 per pound as value for their stockpile material rather than $18, or some higher figure, decreases their paper operating costs. The higher figures increase the cost, resulting in higher SWU prices relative to the market value of uranium. Given a free market not encumbered by government interference, higher SWU prices would result in increased uranium feed demand as utilities attempt to optimize their enriched fuel costs. DOE's surcharge on the variable tails assay option, however, mitigates this beneficial effect for the uranium industry.

It is important, to say the least, to the domestic uranium industry of this country to have an aggressive, competitive enrichment capability. But regardless of the value that DOE places on their uranium stockpile, government policies that depress demand and prices, particularly in a period of severe industry recession, should be prohibited.

ATTACHMENT: Nuclear Resources International Report, dated May 1984

UNION CARBIDE CORPORATION OLD RIDGEBURY ROAD DANBURY, CT 06817
(Umetco Minerals Corporation)

W G ALESIO
VICE PRESIDENT & GENERAL MANAGER
Uranium Coal Gas & Oil

September 20, 1984

Senator Pete V. Domenici
Chairman
Senate Subcommittee on Energy Research & Development
Washington, D.C. 20510

Dear Senator:

I have prepared the following responses to the questions concerning the status of the U.S. uranium industry contained in your letter of September 13, 1984.

Senator Simpson's questions:

1. "Is it reasonable to expect that, if current trends continue for the next few years..... that you will remain in the business for much longer?"

   Since all but one of the major surviving companies are divisions of corporations whose principal business interests are not uranium, it is unreasonable to assume that these companies will be allowed to continue to absorb losses associated with uranium unless it becomes obvious that there is a clearly visible "light" at the end of a tunnel whose length is quantifiable. These companies are also constantly demotivated to stay as a result of activist groups which promote picketing, boycotts of other products, etc., and a stock market perception which tends to treat participation in the nuclear industry as a negative factor.

2. "Once you have placed a mill on standby, what does it take to bring that operation back on line, and what kind of time and resources have to be devoted to such an effort?"

   Placing mills on a standby basis normally does not result in an overwhelming problem. Closing underground mines, on the other hand, often results in a situation whereby in order to go back in it is necessary to start at ground zero because the mine has flooded, ventilation systems have not been maintained, and ground control and support systems must be reestablished. These problems could require as much as 3-5 years and major expenditures (i.e., $20-50 million depending on size and complexity).

3. "Comment briefly on what you see as the reactions of the Canadians and Australians to the condition of the industry in this country, and the steps they are pursuing to express their presence in the domestic market."

Generally, we believe the Australians are concerned more with their own national policies than anything else. The Canadians, on the other hand, are in a position where government entities have major investments in facilities capable of producing many millions of pounds of U_3O_8. However, the economies of scale can be achieved only if the facilities are fully utilized so the U.S. continues to be viewed as the major outlet for this production, especially in view of the fact that a number of the other major consuming nations, such as Japan, have inventories which will carry them through this century. Therefore, the Canadian producers feel compelled in their own self-interest to aggressively pursue new contracts in the U.S.

To illustrate the Canadian situation, Canada Development Investment Corporation recently released its second quarter (1984) financial results which included the following comments:

> "Eldorado Nuclear Ltd. (a Crown Corporation) reported a loss of $1.9 million for the second quarter and $5.4 million for the first half of 1984. This compares with a $10.6 million profit in the first half of 1983"
>
> "Eldorado's loss results from weak uranium prices and increased debt and the Company is competing aggressively in world markets and gaining additional sales as a result. Nonetheless, a loss may be unavoidable for 1984".

4. "How significant in the DOE's presence in the commercial market for uranium?"

We do not share the view that the DOE's presence in the commercial market for uranium is a significant factor.

Senator Domenici's questions:

1. "Would revision of DOE's variable tails assay policy and split tails policy (so that no surcharge can be imposed or so that the government cannot draw down the stockpile) help your business?"

The elimination of the VTAO surcharge could ultimately increase demand for uranium by as much as 10%, or some 3 1/2 million pounds per year. The denial of DOE stockpile drawdown would probably also slightly increase the demand for additional feed. However, since much of this uranium would probably be furnished through utility inventory drawdown, we do not see such policy revision as particularly helpful for the next few critical years.

2. "What do you estimate the cost to be of establishing the Uranium Strategic Reserve which you propose? (i.e., "Energy Emergency Stockpile")?

The estimated cost of the proposed Energy Emergency Stockpile, in 1984$, would be approximately $4.8 billion (120 million pounds at $40/Lb.). We have indicated that the material could be delivered over a six year period and paid for over a period perhaps twice that long. Theoretically, the producers would be indifferent as to the period of payment stretch-out as long as they were compensated for the waiting time.

3. "Approximately how many pounds of uranium would you propose putting into the Energy Emergency Stockpile?"

    a. Would this uranium principally come from existing inventories, or would it be new production?

    b. If it represents inventory drawdown, would your proposal really put any of the miners back to work."

As above, the quantity would be 120 million pounds which would be roughly equal to a 3-year supply. This is believed to be appropriate as an "emergency quantity" in view of the previously described problems associated with bringing back domestic production which has been shut down.

The material would come from domestic production and an annual output of 20 million pounds is deemed appropriate in terms of providing survivors with a base load during the next 4-6 years when other demand is virtually nil. It also represents, if sustained, the capability required to insure that U.S. sources can supply at least 50% of the nations needs.

4. "What is the distinction between the existing DOE stockpile (which approximates 150 million pounds of U_3O_8/equivalent) and the Energy Emergency Stockpile which you are proposing?"

DOE has repeatedly stated that "DOE-owned material is planned for use for working and strategic inventories at the (enrichment) plants and for meeting the long-term requirements of U.S. Government programs." In a recent conversation with DOE, they indicate a possible replenishment of this stockpile beginning as early as 1988.

The proposed Energy Emergency Stockpile would be for the use of commercial nuclear power plants in the event of a supply disruption.

I would like to thank you again for your efforts on behalf of our beleaguered industry and the opportunity to testify before the Subcommittee.

Sincerely,

W. G. Alesio

W. G. ALESIO

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Answers for Senator Pete V. Domenici
From Mr. Eugene A. Lang

1. I understand you just returned from an international uranium conference. Were there any conclusions from the conference about the market for uranium that you would like to share with the Committee?

   Answer: The major sentiment amongst foreign uranium suppliers is that the U.S. government will do little to stop foreign imports to the U.S. Specifically, foreign uranium producers concluded the U.S. Senate would not take action this year or next to limit imports. In addition, a major uranium broker has concluded that foreign uranium will supply at least 50 percent of all U.S. uranium requirements by as early as 1987.

2. What is the single most positive action our government could take to maintain a viable U.S. uranium industry?

   Answer: The single most positive action would be for the government to limit the amount of foreign uranium U.S. utilities can use over a given period of time. This policy would directly result in utilities contracting for U.S. supplies, and thereby serve to revitalize the U.S. uranium industry. Anything short of this action will only indirectly affect the viability of the U.S. uranium industry.

3. You stated that you are in effect where you were three years ago when your company testified on the issue of uranium viability; i.e., the condition of the industry has not improved and foreign imports are still a critical factor to the viability of the U.S. uranium industry.

   Can the U.S. uranium industry afford to wait another three years to take any action? It seems we have studied these issues long enough, what specifically should we do to get this industry back to a viable status?

   Answer: The DOE uranium report concludes that at this time there is little market activity to encourage expansion of domestic U_3O_8 production capacity. The report also states that domestic production capacity will decline to a level of approximately 6,000 tons per year by 1985. While the report projects increases in domestic production capacity by the late 1980's and early 1990's, this is based on unrealistic nuclear power forecasts with which few, if any, experts agree.

Therefore, the U.S. uranium industry can ill-afford to wait another three years for a recovery which few predict will occur. The time to act is now. If the government does not act, then over the next three-year period there will be further contraction of the uranium production sector which can prove to jeopardize U.S. national security interests.

The government should immediately institute controls over the amount of foreign uranium a domestic utility can use; the government should review its use of the uranium stockpile and ensure that this material is not used in such a fashion as to reduce uranium demand; the government should review and, if necessary, revise U.S. enrichment policies so that U.S. utilities can utilize as much U.S. uranium as possible without penalties imposed by the Department of Energy.

4. What effect on utility procurement policies would there be, and what impact would there be on our uranium long-range plans, if U.S. utilities were required to procure 15 years' supply of uranium needs?

Answer: Assuming no limitation is imposed on the use of foreign uranium in the U.S., this policy would require utilities to purchase substantial amounts of uranium on the open market. It is unclear whether U.S. producers would ultimately benefit from this policy. Given the current contracting for low-cost foreign uranium, one could conclude that foreign uranium suppliers may be the greatest beneficiaries of such a policy.

If there is a limitation on the use of foreign uranium, however, this policy would directly result in utilities immediately contracting for future supplies from domestic producers. This would require domestic uranium suppliers to adjust long-range plans so that mines and mills that are currently in a "projected" status, in fact are put on a schedule for actual production. This would assist long-range planning efforts and possibly serve to produce a more economical product.

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Answers for Senator Alan Simpson
From Mr. Eugene A. Lang

1. Many of you represent companies that have uranium mines and mills on standby, awaiting an improvement in market conditions. Is it reasonable to expect that, if current trends continue for the next few years--as DOE has predicted--that you will remain in the business for much longer?

   Answer: DOE projects over the next couple of years a further reduction in U.S. production capacity, reduction in capital invested in exploration and production, and a limitation on the amount of nuclear power development in the U.S. In addition, DOE projects increased uranium imports until foreign uranium comprises approximately 42 percent of all U.S. requirements.

   The key to U.S. producers remaining in the business is for U.S. utilities to begin contracting for domestic uranium supplies. With firm contracts in hand, a U.S. supplier is able to plan future production, as well as capitalize each project. At this time, since there is little, if any, contracting for U.S. production, U.S. uranium producers are essentially supplying long-term contracts which will expire over the 1980's.

   As existing long-term contracts expire and little new contracting for U.S. production occurs, more and more U.S. producers will cease uranium operations and formally get out of the business.

2. Once you have placed a mill on standby, what does it take to bring that operation back on line, and what kind of time and resources have to be devoted to such an effort?

   Answer: Standby status for uranium mills can be of only limited duration under most states' regulations and is very expensive for the mill owner. Regulatory agencies require the same level of compliance effort as for active mills and often apply pressure to begin decommissioning within a relatively short time. Once mill-site reclamation and decommissioning have begun, the costs associated with reactivating the mill become practically prohibitive.

3. I gather from some of the reports that I have heard out of the recent Uranium Institute meeting in London that the foreign producers have, by and large, written off the U.S. uranium industry as a long-term competitive force in the market. I wonder if each of you could comment just briefly on what you see as the reaction of the Canadians and Australians to the condition of the industry in this country, and the steps that they are pursuing to express their presence in the domestic market?

Answer: The most important step foreign suppliers are taking to ensure their competitiveness is to offer extremely attractive terms and conditions in their supply contracts. Specifically, foreign supplies bid for U.S. contracts by offering limited escalation factors, low prices, and the ability of the buyer to limit deliveries or even adjust total quantities throughout the life of the contract. Foreign suppliers are able to do this because much of their potential supply comes from existing production centers (e.g. as a by-product from gold mining in South Africa, or from existing large production centers in Canada or Australia that already have many long-term contracts) and which have ore grades that are extremely favorable.

U.S. producers, on the other hand, have an average production cost of approximately $30 per pound U_3O_8, and typically U.S. mines have reserves in the 5 to 10 million pound range. U.S. producers, therefore, may contract with one or two buyers for any one mine. If that buyer(s) elects to adjust total quantities taken under the contract, or to defer deliveries, this poses substantial hardship on the domestic producer who has committed substantial capital for that one project.

4. Some of you have pointed out in your testimony that the Department of Energy is now engaged in selling uranium from the U.S. stockpile and that this action is serving to reduce domestic demand even further and, as a result, is eliminating jobs in the commercial uranium industry. How significant is the DOE's presence in the commercial market for uranium, how much uranium is coming on the market from the stockpile, and what terms are available for uranium from the stockpile?

Answer: Uranium market experts calculate approximately 53 million pounds of uranium will be utilized from DOE's stockpile in order to operate the DOE split tails program. Under this program, DOE opts to utilize its own stockpile of uranium in lieu of using additional separative work units to enrich material under contract with utilities. By doing this, DOE in effect reduces natural uranium demand because if DOE permitted utilities to supply additional natural uranium and thereby reduce the demand for separative work units, utilities would then procure additional uranium supplies from domestic or foreign suppliers.

In effect, by implementing this policy, DOE significantly impacts the uranium market, yet without providing an opportunity for U.S. uranium suppliers to comment. Of course, U.S. suppliers are the most severely affected by this policy. DOE rationalizes this policy by stating it is operating the enrichment plants in such a fashion to benefit its customers (i.e., foreign and domestic utilities).

Oil, Chemical and Atomic Workers
International Union

NOLAN W. HANCOCK, DIRECTOR
CITIZENSHIP-LEGISLATIVE
DEPARTMENT

1126 - 16TH STREET, N.W.
WASHINGTON, D.C. 20036
PHONE (202) 223-5770

October 1, 1984

The Honorable Pete V. Domenici, Chairman
Subcommittee on Energy Research and Development
Washington, D. C. 20510

Dear Senator Domenici:

I want to thank you for holding the hearing to discuss the President's Report to the Congress on the Status of the U.S. Uranium Mining and Milling Industry. I also want to thank you for allowing OCAW the opportunity to appear before your Committee, to testify about our concerns and the concerns of our unemployed uranium miners in New Mexico.

I am in receipt of your letter dated September 13 and following is my response to the questions which you set forth in your letter:

1. If the status of the uranium industry continues in its depressed condition , will there be any trained labor forces remaining in the years to come for increased production requirements?

If the status of the uranium industry continues in its depressed condition the industry will lose its trained labor forces. Uranium miners, mill operators, maintenance personal, engineers, etc. all will seek other employment outside the uranium industry. Not only will trained underground miners be lost, but also the above ground trained support personnel. Only those workers that are unemployable for various reasons will be left as the uranium mining and milling force continues to recede.

2. The Department of Labor obviously recognizes the impact foreign uranium is making on U.S. uranium companies, yet the Department of Energy fails to admit a problem exists.

What actions would you suggest the Department of Energy take that would be most advantageous to the U.S. uranium labor force?

Because uranium is an energy source needed for America's energy independence, I would restrict the imports of uranium to a reasonable limit of the market. I feel uranium imports should not exceed 17 to 20% of the U.S. market. I feel it was a mistake for Congress to completely phase out uranium import restrictions. We can not expect a viable uranium industry to exist under present market conditions without a reasonable import restriction.

I would also recommend that DOE refrain from selling off uranium supplies that are stockpiled into an already depressed market. This action by DOE just exacerbates the problem, causing more workers to be laid off and additional hardships for the industry.

3. Would you expand on your comments that there is little, if not any, money available to provide worker-assistance under the Department of Labor?

Current law stipulates that an unemployed worker loses his eligibility for cash benefits under TAA within one year of when he/she was first separated from his/her job. Consequently, workers who were laid off for at least one week in 1981, 1982 or before mid-1983 are out of the program. They are ineligible for income support, so they are effectively denied even to think about the TAA retraining program.

Therefore, retraining is a false promise because their is no money to pay any assistance while they are in training.

As an example of the ineffectiveness of the training program, less than 5% of the Steelworkers certified under the TAA program have entered training, with less than 1% completing training.

The three other programs under TAA, the cash benefits, job relocation, and job search assistance are all funded under the Entitlement Program. TAA funds under this program have been so severly slashed as to make the program also a false promise of hope to workers who may finally be certified as eligible.

I again want to thank you for this opportunity to respond to your questions. I also thank you for your efforts to assist the uranium industry and their employees, and urge you to continue your efforts in their behalf.

Sincerely,

Nolan W. Hancock, Director
Citizenship-Legislative Department

SEQUOYAH FUELS CORPORATION
POST OFFICE BOX 25861 • OKLAHOMA CITY, OKLAHOMA 73125

September 24, 1984

ROBERT P. LUKE
EXECUTIVE VICE PRESIDENT

The Honorable Peter V.Domenici
United States Senate
Room 4239
Dirksen Senate Office Building
Washington, D. C. 20510

Dear Senator Domenici:

Thank you for your letter of September 13, 1984 and the opportunity to appear before your sub-committee on September 12. You asked that I respond in writing to the following questions.

1. The recommendations you make are specifically directed toward modifying the DOE enrichment policies. In your mind, what impact would there be on the domestic uranium industry if imports were limited, but enrichment policies remained the same?

   With respect to the trade-off between enrichment policies and import limitations, my thoughts are as follows. The U. S. uranium industry is in grave difficulty and its needs are immediate. If import controls had been in place two or three years ago, it is possible that this action could have sustained the domestic uranium industry. However, most of the long term uranium sales over the past several years have gone to the Canadian suppliers. Further, the new enrichment contract allows most of the remaining uncommitted demand to be postponed several additional years. It is my view that without some short term modifications in enrichment policies, we will be unable to sustain very much of a domestic uranium industry. During the 1990's when much of the U. S. market is still open, the possibility of import controls to sustain a healthy level of domestic production is still feasible.

2. What cost would you attribute to U. S. federal and state regulation on your uranium producing operations?

   The cost of regulation in the uranium industry is extremely difficult to separate from the on-going costs of operations. Some of the same costs would be incurred absent regulations. However, the best estimate Kerr-McGee has been able to make

A SUBSIDIARY OF KERR-McGEE CORPORATION

on this subject is a total regulatory cost burden between \$8 and \$10 per pound of U_3O_8 produced.

3. How far in advance do utilities generally contract for their uranium supplies? Is long-term contracting by utilities being done in such a fashion to allow U. S. producers to adequately plan, permit, and operate new uranium mines to meet future needs? Of the contracting occurring at this time, how much is for U. S. production versus foreign production?

On average, utilities seem to plan their fuel procurement approximately five to ten years into the future. In recent years, nuclear plant construction and licensing uncertainties and delays have led to inventory accumulation and a short-term attitude about uranium procurement among some fuel buyers. DOE enrichment contract changes have had a far greater impact on uranium contracting and the ability to make future plans than have utility procurement practices.

We believe that over the past two years, most of the long-term purchasing of uranium has been from foreign sources. The Department of Energy Survey of the U. S. Uranium Marketing Activity, 1983 reports that during 1982 and 1983 there were 35 million pounds of new foreign commitments. It is difficult to tell from the DOE statistics how much uranium was sold by domestic producers during this same time period, but I suspect terminations were as great as new sales.

Very truly yours,

RPLuke

R. P. Luke

RPL:kf

SEQUOYAH FUELS CORPORATION
POST OFFICE BOX [illegible] • OKLAHOMA CITY, OKLAHOMA [illegible]

September 24, 1984

ROBERT P. LUKE
EXECUTIVE VICE PRESIDENT

The Honorable Alan Simpson
United States Senate
Room 457
Dirksen Senate Office Building
Washington, D. C. 20510

Dear Senator Simpson:

Thank you for the opportunity to appear before you at the Senate Energy Subcommittee hearings on September 12. Senator Domenici's letter of September 13th requested that I respond to the following questions.

1. Many of you represent companies that have uranium mines and mills on standby, awaiting an improvement in market conditions. Is it reasonable to expect that, if current trends continue for the next few years--as DOE has predicted--that you will remain in the business for much longer?

   While it is impossible to predict the future, it should be pointed out that Quivira Mining is already among a very few companies remaining in production.

2. Once you have placed a mill on standby, what does it take to bring that operation back on line, and what kind of time and resources have to be devoted to such an effort?

   The mill is perhaps less a problem than the mining facilities, however, assuming the source of mill feed is available and trained personnel can be rehired, a six to nine month mill reconditioning program at a cost of a million dollars or more would be required.

3. I gather from some of the reports that I have heard out of the recent Uranium Institute meeting in London that the foreign producers have, by and large, written off the U. S. uranium industry as a long-term competitive force in the market. I wonder if each of you could comment just briefly on what you see as the reaction of the Canadians and Australians to the condition of the industry in this country, and the steps that they are pursuing to express their presence in the domestic market?

I think the U. S. (utilities and government officials) will eventually conclude that a healthy domestic uranium industry is an important economic advantage for this country. In the long run, uranium costs will be lower and supply more dependable if a majority of uranium comes from home.

4. Some of you have pointed out in your testimony that the Department of Energy is now engaged in selling uranium from the U. S. stockpile, and that this action is serving to reduce domestic demand even further and, as a result, is eliminating jobs in the commercial uranium industry. How significant is the DOE's presence in the commercial market for uranium, how much uranium is coming on the market from the stockpile, and what terms are available for uranium from the stockpile?

   This question is extensively discussed in a report prepared by Nuclear Resources International for Quivira Mining Company titled "DOE Enrichment Policies and the U. S. Uranium Industry", dated September, 1984. We strongly believe that uranium enrichment policies are an issue of immediate and utmost importance to the domestic uranium producers.

Very truly yours,

RPLuke

R. P. Luke

RPL:kf

PATHFINDER

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550 California Street
San Francisco, California 94104
(415) 981-6350
Telex 278592

M. Ian Ritchie
President and
Chief Executive Officer

September 20, 1984

FEDERAL EXPRESS

The Honorable Pete V. Domenici
United States Senate
Washington, D.C. 20510

Dear Senator Domenici:

In accordance with your request, enclosed are the responses of Pathfinder Mines Corporation to the inquires you forwarded to me with your letter of September 13, 1984.

I appreciate having had the oppportunity to participate in the proceedings and if we may provide any further information, please let me know.

Very truly yours,

M. I. Ritchie

Encs.

Questions for Mr. M. Ian Ritchie
From Senator Pete V. Domenici

1. You indicated that Pathfinder is currently negotiating another long-term "arrangement" with a U.S. utility. Other uranium producers have argued that it is very difficult, if not impossible, to compete now with low-cost foreign suppliers that are entering the U.S. market.

   In your mind , what is it about Pathfinder Mines that make it successful in competing against other suppliers?

2. To what extent do you believe U.S.-origin uranium is attractive to foreign buyers? To what extent is U.S.-origin uranium competitive with foreign-sourced uranium?

3. How would you characterize DOE's enrichment policies and their effect on the U.S. uranium industry? What changes would you suggest to these policies?

Questions for Uranium Company Witnesses
From Senator Alan Simpson, Wyoming

1. Many of you represent companies that have uranium mines and mills on standby, awaiting an improvement in market conditions. Is it reasonable to expect that, if current trends continue for the next few years--as DOE has predicted--that you will remain in the business for much longer?

2. Once you have placed a mill on standby, what does it take to bring that operation back on line, and what kind of time and resources have to be devoted to such an effort?

3. I gather from some of the reports that I have heard out of the recent Uranium Institute meeting in London that the foreign producers have, by and large, written off the U.S. uranium industry as a long-term competitive force in the market. I wonder if each of you could comment just briefly on what you see as the reaction of the Canadians and Australians to the condition of the industry in this Country, and the steps that they are pursuing to express their presence in the domestic market?

4. Some of you have pointed out in your testimony that the Department of Energy is now engaged in selling uranium from the U.S. stockpile, and that this action is serving to reduce domestic demand even further and, as a result, is eliminating jobs in the commercial uranium industry. How significant is the DOE's presence in the commercial market for uranium, how much uranium is coming on the market from the stockpile, and what terms are available for uranium from the stockpile?

RESPONSE TO QUESTIONS FROM SENATOR DOMENICI

1. It is indeed very difficult to compete now with low cost foreign suppliers that are entering the U.S. market. To our knowledge, only three or four U.S. producers have been successful in making long-term contracts with U.S. utilities since the beginning of 1982. Meanwhile, Canadian and European producers have been successful making long-term contracts and they, together with U.S. utilities and other "middle men", have been very active and very successful in the spot market. To the extent that Pathfinder has been successful in competing against other suppliers, that success probably results from paying very careful attention to the individual needs and circumstances of each potential customer. In some instances we benefit from strong long-term relationships with reliable customers that have been developed over many years.

2. We believe that U.S. origin uranium can be attractive to certain buyers because it represents an important diversification of supply and an opening into the freely competitive U.S. market, which may be useful as a hedge against the possible uncertainties of non-U.S. supplies. U.S. origin uranium is not fundamentally competitive with foreign source uranium. That is, it cannot compete on a price basis, due both to the relatively small size and low grade of U.S. deposits and to the current strength of the U.S. dollar. U.S. uranium is able to find customers only as a minor diversification of supply for foreign utilities or because U.S. utilities have decided to purchase a certain portion of their requirements from domestic suppliers only.

3. I would characterize DOE's enrichment policies over the years as being very inconsistent and in large measure responsible for many of the problems, both past and current, of U.S. ura-

nium producers. Initially, DOE offered requirements-type contracts to U.S. utilities. Subsequently, about 1973, these were replaced by a long-term (10 year) fixed commitment contract, which was eventually signed by the majority of utilities. The firm long-term nature of this contract quickly created an immense demand for U308, as utilities attempted to find uranium to match their firm enrichment commitments with the U.S. government. This led to boom conditions in the uranium industry and laid the grounds for a rapid expansion of capacity, which is an important factor in the current depressed state of the industry. As the utilities' firm enrichment obligations with DOE became more and more out of touch with their actual requirements, DOE was forced to permit adjustments to be made, which led first to the "adjustable fixed commitment" (AFC) contract and eventually to the current "USEC" contract, which is essentially a requirements contract. While the current contract is probably necessary as a response to overall market conditions, certain features make its depressing effect on the U.S. uranium industry even worse. By being very accommodating in individual negotiations with utilities concerning conversion to the new contract, DOE is allowing U.S. utilities as a group to draw down inventories very sharply in the next several years. This will greatly reduce their requirements for additional U308. The new contract also allows U.S. utilities to purchase a portion of their enrichment needs (normally up to 30 percent) from third parties, perhaps in the form of enriched uranium, on the secondary market. Nuclear Exchange Corporation, in their September 1984 monthly report to subscribers, indicates that the combined effect of these two features will reduce uranium demand by U.S. utilities by approximately 70 million pounds of U308 over about the next eight years. Furthermore, as an operating decision, DOE has decided to reduce its overall cost of enrichment by operating on a split tails basis, under which the enrichment plants will be operated at a substantially higher tails assay than that which will be used to calculate the feed to be supplied by its customers. The difference in uranium requirements would be made up from DOE's stockpile, which has recently been artifically revalued to very low levels. It has been estimated by Mr. Luke in his testimony that this method of operation will require about 50 million pounds of additional uranium over the next six or seven years. The additional demand created by reversing all these actions would be approximately 120 million pounds over about an eight-year period. Such additional demand would go a long way to restoring the health of the domestic uranium industry. While it may be unrealistic to suggest that all of these policies be reversed, certainly DOE, if it is to recognize its responsiblity to maintain a viable U.S. uranium industry, should take steps immediately to curtail the negative impact of its enrichment conversion terms and should plan to buy the additional feed requirements created by its split tails policies from domestic producers rather than use up its artificially undervalued stockpile.

RESPONSE TO QUESTIONS FROM SENATOR SIMPSON

1. While Pathfinder does not presently have any of its operations on standby, it is our impression that the longer an operation is placed on standby, the greater will be the deterioration of capital equipment, and the work force, which would have largely been laid off. This would make it more difficult and more expensive as time passes to re-equip and re-staff the operation. Thus, some operations would likely be permanently shut down or would require much higher market prices to justify the time and expense to bring them back on line. If current conditions continue for several more years, it seems doubtful that most producers will be able to remain in business.

2. The time and resources needed to bring a mill back on line from a standby condition will depend in great measure on the level of care and maintenance performed during standby. If a high level of care of maintenance is assumed, then, at least during the first few years of standby, it would be necessary only to assemble and train new operating crews, purchase and stock initial loads and working inventories of mill reagents and materials, and do some minor capital refurbishing. Perhaps this might take about six months in time and cost not more than one to two million dollars for an average size mill. However, if less than a high level of care and maintenance is performed or if the period of standby is extended beyond a few years then the time and cost to return the mill to an on-line condition will increase, perhaps substantially, until it will soon become uneconomic under any reasonable future price scenario.

3. Our experience in the last few years is that the high grade relatively low cost deposits of western Canada are formidable competitors in the uranium market. Canadian producers have been very successful in making short-term and long-term con-

tracts in the United States due to their proximity to the U.S. market and their low offering prices. The Australian deposits that are currently producing uranium are also relatively low cost, and the Australians have been quite visible in the domestic market. However, due to Australian government restrictions, they have not been able to compete on a price basis with the Canadians and have therefore been less successful in obtaining contracts. It has been repeatedly stated by most observers that the U.S. market represents the best opportunity for new contracts over the next five years or so, compared with European or Far Eastern markets. The Canadians, Australians and other foreign suppliers are going after this new business very aggressively.

4. The impact of the actions of the Department of Energy on the commercial market for uranium is a fairly complicated subject. Basically, DOE is not selling uranium from the U.S. stockpile directly into the commercial market. However, by revaluing the cost of its stockpile of uranium to an artificially low number and then substituting this lower cost uranium for higher-cost separative work units (SWU) through a split tails policy, DOE is able to reduce the price it charges utilities for the SWU that it will sell, since this price is based on its costs. Because DOE is able to reduce the price for its enrichment services, utilities should use more enrichment services, and less uranium, to produce the enriched uranium that will be required to operate their nuclear plants. This will reduce uranium demand below the level that would be obtained in a free market, were DOE's price not being subsidized in this manner. However, the much greater effect is that DOE is estimated to use approximately 50 million pounds of U308 from its stockpile through the early 1990s. If this material were instead purchased from U.S. producers, it would represent an important boost to our chances for survival. Additionally, DOE's uranium stockpile would be retained intact for use in the event of a real emergency. Unfortunately, DOE's current operating plans for its enrichment facilities simply represents another in a long line of DOE policy decisions that have been made with a total disregard for their effect on the U.S. natural uranium industry.

Appendix II

Additional Material Submitted for the Record

21 September 1984

STATEMENT BY THE AUSTRALIAN GOVERNMENT

Australian Labor Party (ALP) Policy

The policy on uranium of the ALP, as adopted at its July 1984 Biennial Federal Convention, specifically provides for the export, under appropriate safeguards conditions, of uranium not only from the existing Ranger and Nabarlek maining operations but also from the Olympic Dam (Roxby Downs) deposit. The Olympic Dam deposit alone is estimated to contain more than one million short tons of uranium. That policy further states, inter alia, that no subsidies, tax incentives or compensation of any kind would be provided to the uranium industry either directly or indirectly, including in the event of uranium companies seeking assistance as a result of a weakening market. The full text of the ALP uranium policy is attached.

Subsidisation

There are no subsidies or tax incentives of any description specific to the Australian uranium industry, nor is any change in that position anticipated. Furthermore, as noted above, the ALP policy specifically proscribes any such measures. Moreover, and contrary to the Canadian situation, the present Australian uranium industry is free of Government ownership and its production is exclusively for export. Accordingly, there can be no opportunity for subsidisation of export prices by (non-existent) domestic sales.

Nor are there any indirect subsidies to the Australian uranium producers in respect of less stringent environmental requirements. There are, of course, minor differences in the regulatory requirements of the United States and Australia, but generally there is a considerable similarity in the overall needs of environmental protection. The actual extent of monitoring networks, the frequency of measurements, and the extent and number of reports sought is believed to be greater for the two operating mines in Australia (Ranger and Nabarlek) than is generally the case in the United States. The environmental protection regime for those mines was established following an exhaustive inquiry, the Ranger Uranium Environmental Inquiry (RUEI) which examined both the wroldwide and local regional environmental issues associated with the mining, milling and export of uranium.

Furthermore, the industry must not only comply with stringent environmental requirements, but also due to the remoteness of the mines bear substantial infrastructure costs. Royalties are payable to state/territory governments and, where applicable, payments are also made to aboriginals. Normal company taxation applies.

The minimum terms of sale for Australian uranium are determined by the Government, which exercises export control over uranium. The mandated terms are commercially non-discriminatory and include a floor price, the level of which is confidential.

Reliability of Supply

There have been two major reviews of Australian policy on uranium in the past decade. The first of these, the RUEI, concluded that development of the uranium industry should be allowed to continue under controlled conditions in view of, inter alia, the importance of supplying uranium to an "energy deficient" world. The second review, undertaken by the Australian Science and Technology Council, also concluded that development should be allowed to continue recognising, inter alia, the contribution Australia could make to the stability and reliability of energy suppy through its uranium exports.

Both these inquiries were watershed events, affirming as they did, after a most exhaustive analysis, Australia's participation in the nuclear industry. As such, both played an important role in the evolution of Australia's uranium policy. The Government has recently decided that Australia is to continue its involvement in the nuclear industry by allowing the export (under stringent safeguards conditions) of uranium from the Ranger, Nabarlek and the Olympic Dam (Roxby Downs) deposits.

Significantly, and notwithstanding any perceived uncertainty that may have arisen during those two major reviews and the evolution of our uranium policy, there has never been any threat to the supply of uranium contracted between Australian producers and United States utilities. Deliveries under these contracts have never been impeded, and accordingly there can be no basis for suggesting that Australia is not a reliable supplier of uranium to the United States.

EXTRACT FROM THE AUSTRALIAN LABOR PARTY (ALP) CONSTITUTION AND RULES 1984

O URANIUM

Recognising that —

Associated with the production of uranium and its use in the nuclear fuel cycle are hazards and risks of unique severity and unprecedented scale, including —

a the threat to human health and the local environment of the mining and processing of uranium, unless strict safety procedures are established and enforced;

b the use of technologies and the generation and circulation of products within the nuclear industry, which are useable as the raw materials for nuclear weapons manufacture, and which therefore demand the enforcement of effective controls to prevent the diversion of such technologies and products to nuclear weapons proliferation;

c the generation, as by-products of the nuclear industry, of highly toxic radioactive wastes, which unless safely managed pose a threat to current and future generations of human life, and for which no safe disposal methods are currently in use.

Significant quantities of Australian uranium are already in use in the world nuclear fuel cycle, and that Australia has the potential to continue as a major supplier of uranium with existing contracts approved by successive governments or with possible further contracts.

Alternative sources of supply of uranium are available to the world's nuclear power industry, including some which are subject to less stringent nuclear safeguard conditions.

Mining communities, investors and aboriginal communities have made commitments as to the location of labour, and spending on investment, and based on expected incomes from established uranium mining and processing operations.

Internationally, nuclear power contributes, and will continue into the immediate future to contribute, a substantial proportion of the supply of electricity in a number of countries.

In most situations in many industrialised countries, of all the possible electricity generation sources — including coal, oil, nuclear, hydro, solar — only solar-derived power is environmentally neutral, and only coal-fired power is cost competitive with nuclear power. However, the potential cost of decommissioning nuclear plants and providing for improving tighter security and environmental controls needs to be allowed for.

Many industrialised countries have adopted nuclear power as a means of avoiding dependence on a single source of energy supply and there is increasing concern about the environmental impact of fossil fuels in increasing CO_2 levels and causing acid rain.

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT), the key international covenant designed to prevent the spread of nuclear weapons and to bring about nuclear disarmament, provides (Article III) that non-nuclear weapon States undertake to work within the IAEA's safeguards system to stop the diversion of nuclear materials to weapons manufacture.

Seeking to —

Take a positive role in preventing the proliferation of nuclear weapons and promote the development and implementation of effective international arrangements covering nuclear non-proliferation treaties, waste disposal, arms control and nuclear disarmament.

Contribute, in particular, to improvements in those technologies and institutional controls which can prevent the misuse of the civilian nuclear power industry from assisting in the proliferation of nuclear weapons.

Contribute, in particular, to the development of satisfactory and effective arrangements for the safe storage and disposal of nuclear wastes, especially of high level wastes generated in nuclear reactors.

Act to promote nuclear safety, safeguards and security both alone and in co-operation with other responsible nations and international organisations as appropriate, especially where the interests of Australia itself and of other countries of this region are affected.

Avoid precipitating the development of fast-breeder reactors.

Regarding as paramount in determining our attitude towards the supply of Australian uranium to the world nuclear fuel cycle —

Whether, and under what conditions, the export of uranium from Australia can contribute towards improved nuclear non-proliferation policies and practices internationally.

Whether, and under what conditions, the export of uranium from Australia can support the more determined resolution of the high level nuclear waste management problem,

and believing, on balance that —

The risks and hazards associated with nuclear materials and technologies should be reduced by Australia enlisting greater international co-operation among responsible actual and potential participants in the nuclear fuel cycle.

For the time being at least, Australia's ability to contribute to the reduction of those risks and hazards will be enhanced if Australia continues to participate, as a uranium exporter, in the nuclear fuel cycle, but only on the terms and conditions set out below —

A Labor Government will, subject to all contracts complying with Australia's floor price —

57 Allow the export of uranium from only Nabarlek, Ranger and Roxby Downs mines under the most stringent nuclear non-proliferation conditions, to those countries which the Government is satisfied observe the NPT, maintain strict safeguards and security controls over their nuclear power industries, are committed to non-proliferation policies, and have ratified the international and bilateral

nuclear safeguards agreements necessary to support these controls and these policies.

58 Prevent the development of any mines, other than Nabarlek, Ranger and Roxby Downs.

59 Reserve the right in accordance with Recommendation 6 of the first Fox Report, to withhold supplies of uranium 'permanently, indefinitely or for a specified period' from any country which ceases to observe the non-proliferation safeguards and security conditions which are applied to Australian uranium exports to that country, or which adopts nuclear practices or policies inimical to further advance in the cause of nuclear non-proliferation;

60 Refuse to allow the supply of Australian uranium to France until France ceases testing nuclear weapons in the South Pacific region;

61 Prohibit the establishment in Australia of nuclear power plants and all other stages of the nuclear fuel cycle.

62 Provide no subsidies, tax incentives or compensation of any kind to the uranium industry either directly or indirectly, particularly in the event that the uranium companies seek government assistance as a result of the weakening uranium market;

63 Promote to the necessary level the research and development of promising technology for the handling and disposal of high level nuclear wastes, in view of the absence of such safe disposal methods;

64 Ensure that the first consideration for workers in the uranium industry is the protection of their health and subject the standards of health protection to constant checking to ensure that they are enforced, researched and where necessary improved, monitored and reported;

65 Ensure that the quality of the environment influenced by the uranium industry is subject to strict standards, monitoring and protection;

66 Vigorously oppose the ocean dumping of radioactive waste;

67 Establish a permanent commission to address on an ongoing basis the full range of issues relating to the nuclear fuel cycle, make recommendations on what action Australia will take to further strengthen Australian safeguards requirements and the operations of the international nuclear safeguards system and to report regularly to the Government and Parliament;

68 Require that the IAEA safeguards regime be strengthened by moving that an IAEA inspector be physically placed on site at each reactor, enrichment and reprocessing plant covered by the IAEA for the purpose of personally supervising the implementation of IAEA full scope safeguards. After this condition has been adopted by the IAEA a Labor Government reserves the right to withhold uranium supplies to any country which refuses to accept it.

69 Mount a specific initiative in order to strengthen the application of Articles III and IV of the NPT and to exercise maximum Australian influence towards the most effective possible implementation of the NPT by —

a pursuing an agreement at the 1985 NPT Review Conference that no NPT member State shall ever supply nuclear materials, equipment and technology to any non-nuclear weapons State which is not a party to the NPT or which does not accept full scope safeguards under the IAEA; and

b when such an agreement is obtained a Labor Government will extend existing Australian bilateral safeguards agreements to incorporate the above undertaking on the part of recipients of Australian uranium.

70 Pursuant to Article VII of the NPT providing for regional treaties to assure the total absence of nuclear weapons, continue to seek the declaration of the South West Pacific as a nuclear free zone. It will promote positively the development of an Indian Ocean zone of peace and seek to negotiate additional non-proliferation arrangements in the South and South East Asian regions.

71 Demand that the IAEA's functions be divided in order to leave it as an exclusively regulatory and verification body.

72 Undertake appropriate research and provide assistance to the energy impoverished nations of the world to find energy solutions which are more suitable to their decentralised populations and which are a real alternative to reliance upon large blocks of expensive centralised nuclear generation with extensive reticulation grids.

73 Encourage the development and application of passive energy technologies more suitable to our fragile global environment which the development of the nuclear cycle has delayed.

74 Consistent with our NPT obligations facilitate the transfer to third world countries the other benefits of nuclear technology such as nuclear medicine and food preservation.

JOHN J. KEARNEY, Senior Vice President

EDISON ELECTRIC
INSTITUTE The association of electric companies

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September 26, 1984

The Honorable Pete V. Domenici
Chairman
Subcommittee on Energy Research and Development
Committee on Energy and Natural Resources
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

The Edison Electric Institute is pleased to provide the enclosed statement for the record regarding your September 12, 1984 hearing on the status of the domestic uranium supply industry. We would be pleased to answer any questions you might have concerning our statement or any of the points raised by the witnesses on September 12.

Sincerely yours,

John J Kearney

John J. Kearney

JJK:skj
Enclosure

cc: The Honorable Donald P. Hodel
The Honorable Danny J. Boggs
The Honorable J. Erich Evered
Mr. John R. Longenecker
Dr. R. Gene Clark

STATEMENT OF
EDISON ELECTRIC INSTITUTE
ON
STATUS OF U. S. DOMESTIC
URANIUM MINING AND MILLING INDUSTRY

SUBMITTED TO

SUBCOMMITTEE ON ENERGY RESEARCH AND PRODUCTION
COMMITTEE ON ENERGY AND NATURAL RESOURCES
UNITED STATES SENATE

September 12, 1984

The Edison Electric Institute (EEI) is pleased to have the opportunity to submit this statement for the record. EEI is the association of electric companies. Its members generate 76 percent of all the electricity in the United States, serving 73 million customers. Since many member companies either operate or are building nuclear reactors for the generation of electricity, EEI is vitally interested in the assured economic supply of natural uranium. Through its purchase of uranium for the production of nuclear fuel, the utility industry, in effect, provides the revenues that support the uranium industry. It is worth keeping in mind that other than for the production of electricity, uranium has no commercial use.

In May of this year, the President provided Congress, in accordance with Section 23(a) of PL #97-415, a report entitled, Comprehensive Review on the Status of the Domestic Uranium Mining and Milling Industry. This report was prepared for the President by the Energy Information Administration (EIA) of the US Department of Energy. The government has forecast that the U.S.

uranium mining industry's position will improve as the large inventories currently existing are drawn down by the late 1980s. However, even under this outlook it can be estimated that the annual requirements of domestic utilities in the next ten to fifteen years may not exceed the U.S. uranium industry's 1980 production capacity. Thus, even if there were to be no imports in the future, the domestic production industry might not be as large as it has been until the next century, if then.

Section 23(b) of PL #97-415 requires the Secretary of Energy to make a determination of the viability of the U.S. uranium industry each year for the next ten years, based on criteria established by EIA by rulemaking in October 1983. The criteria are intended to measure four industry attributes: resources capability, supply response capability, financial capability, and import commitment dependency. While the Secretary proposes to publish the viability determination later this year, there is no indication of what is likely to be its direction.

The Institute believes, as the President's report also points out, that the primary cause of the domestic uranium industry's current state has been the slower than anticipated development of nuclear power programs, both in the U.S. and around the world. U.S. utilities already have about three-quarters of their uranium requirements for the next 10 years under contract with suppliers. In addition, utilities are holding about 75,000 tons of uranium in inventory, an amount equal to cumulative demand through the end of 1988. (Suppliers hold an additional 18,500 tons.)

In the mid-1970s, the domestic uranium industry approximately doubled its production capacity to meet the large future demand then projected. In 1974, the U. S. government was forecasting a 1985 installed nuclear power capacity of 250,000 MWe[*], four times that presently in commercial operation and about twice that now forecast to be in operation by the end of the century. While there is about 72,000 MWe of nuclear capacity either currently in commercial operation or in the start-up phase in the U.S., and about 41,000 MWe more capacity under construction, there have been no new significant plant commitments since 1974 and none are imminent. The schedules of some of the plants under construction may be delayed and in some cases units may even be cancelled. Under this outlook the annual requirements of domestic utilities for uranium in the next fifteen years may not exceed the U.S. uranium industry's production capacity in 1980.

The dramatic reduction in U.S. nuclear power commitments over the past five years has had a profound impact on the domestic uranium industry. The reductions, in the form of plant schedule slippages, deferrals and cancellations, have generally come about as a result of a complex combination of factors and events including: moderation of electricity growth rates, cost escalations and high interest rates, intense and prolonged anti-nuclear power activism, and a proliferation of regulatory requirements. At the same time as the domestic utility industry has wrestled with these problems, the uranium industry has contracted to about one-third of its record size in 1980.

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[*] WASH-1139(74), U.S. Atomic Energy Commission, February 1974.

It is worth noting that the domestic uranium industry's large capacity at the end of the 1970s was partially a result of the unrealistically high nuclear power growth forecasts of the early 1970s, the substantial uranium revenues of the mid-1970s, and the consequent industry momentum. A further factor in the uranium industry's growth in the 1970s was the enrichment policies of the U.S. government that required utilities to enter into long-term contract arrangements prematurely. This is certainly one of the reasons why utilities are now holding excess uranium inventories and have commitments for uranium deliveries in excess of need. While the DOE's new Utility Service Contract with utilities will largely alleviate this excess supply situation, it will also result in some near-term uranium demand reduction.

The demand fall off and the inventory and contractual excesses just discussed have resulted in the market price for uranium being depressed since the beginning of the 1980s. Because the pricing of new long-term contracts tends to be directly or indirectly related to the market price, the depressed pricing situation has resulted in the closure of a large fraction of U.S. uranium mining operations. In many cases, producers have turned to obtain supply in the secondary market where material is in abundance and prices are relatively low, and generally less that U.S. production costs. In some instances, producers have found the purchase of foreign uranium to fulfill delivery commitments to be financially more expedient than continued production.

While many domestic and some foreign producers have found it increasingly difficult to continue to operate in this soft marketplace, certain foreign producers, with relatively low cost operations, have been able to do so. In fact, according to the President's Report, such foreign producers were the only primary source of uranium capable of offering price terms that were competitive with the price of uranium being sold from inventories on the secondary market. Prior to 1982, the net of U.S. imports and exports did not exceed 1,100 tons. However, in 1983 the net rose to 6,300 as the result of a major U.S. producer accepting payment of uranium instead of cash for the sale of a significant production center owned and located in Canada.

EIA has projected that the import fraction will increase in the next few years as deliveries are made to U.S. utilities on contracts entered into during the soft market of the past few years. While U.S. utilities have always shown a preference for domestic fuel supplies, and uranium is no exception, they cannot be faulted for taking advantage of the substantive economic benefits offered by certain foreign producers -- advantage that U.S. producers are also enjoying. In 1983, for example, the EIA has reported that the average price paid for foreign origin imported material was $26.16 per pound, as compared to a total average price of $38.21 for U.S. origin material and foreign origin material supplied by U.S. producers.*

The domestic uranium suppliers have recently alleged that the Canadian uranium producers are receiving subsidies from either the Canadian government or the Saskatchewan provincial government. The domestic electric utilities are not equipped to determine the truth of this charge; it is clearly a matter for the Federal Government to investigate. However, until such a time as these imports are restricted in some manner by U.S. Government action, U.S. electric utilities owe it to their customers and stockholders to seek the lowest cost fuel supply consistent with prudent fuel supply management.

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*DOE/EIA-0403(83), Survey of United States Uranium Marketing Activity 1983, August 1984.

The President's report presents the results of an analysis of uranium production and pricing under scenarios that hypothesize the imposition of 20, 30, and 40 percent import ceilings or quotas, and the imposition of a 25 percent tariff on import prices. The results show that cumulative U.S. uranium production through 1993 would only increase by about 6 percent, if either the 20 percent ceiling or the 25 percent tariff were to be imposed. However, the imposition of such a ceiling or tariff would result in uranium price increases that would cost the domestic utility industry and, thereby, the electricity consumers, about $7 billion in 1983 dollars in the same period. The cumulative cost of such a ceiling would be about $23 billion, in 1983 dollars, through the end of the 1990s, with a cost of about $2 billion per year being typical in the 1990s. The very substantial increase in cost to utilities and ultimately the consumer is projected to result from the production of higher cost domestic ores and the narrower marketplace imposed by either an embargo or tariffs.

The President's report does not clearly emphasize the large potential costs to electricity consumers of either quotas of tariffs. Again, it does not point out that while the relatively small potential increase in annual production would enhance the uranium industry's cash flow position, the relatively small increase in production would not lead to significant mine reopenings or employment increases until well into the 1990s. This is a very significant point to be considered in a national political context. If such trade policies were to be pursued, one or two states would see very marginal benefits while the rest of the country bore the large economic burden.

There has been a proposal from a domestic supplier to implement an Emergency Stockpile Acquisition Program that would allow a select number of producers to wait for an upturn in the market in the next four to six years. This program proposes that the DOE acquire a 60,000 ton energy emergency stockpile over a six year period. This proposal does not appear to be in concert with the policies of the current Administration nor take into account the fact that the DOE already has an inventory of about 78,000 tons of natural uranium equivalent material, and more than 90,000 tons of tails material if an assay greater than 0.20 percent is taken into account. From the standpoint of national security, it is surmised that the Department of Defense has a substantial stockpile remaining from the one-third million tons it purchased in the period 1949-1970.

While the Emergency Stockpile proposal, if implemented, would tend to support the continued mining of existing marginal cost deposits, these deposits would probably be mined out and refined by the late 1980s. Furthermore, the financial support for such a program would be unlikely to generate substantial exploration and development activity to find uranium to meet demand in the 1990s. The Institute believes that uranium industry stability would be restored more quickly if domestic producers purchased excess utility inventory material rather than turning to foreign producers for their supply. In this way the excess inventories could be drawn down more rapidly and market order restored.

EIA has projected that uranium prices will rise in the second half of the 1980s as inventories are drawn down. It projects that the U.S. uranium mining industry will begin to expand as prices increase. It further projects that the expansion will be at a rate of about 5 to 6 percent per year, a rate that is regarded as healthy in the mineral industry. These projections do not assume the imposition of either embargoes or tariffs, but do assume that U.S. utilities will have a total net import of between 32 and 46 percent of their collective requirements through the year 2000. The mean of the range is approximately equal to the Import Commitment Dependency 37.5 percent criterion established by PL #97-415. The Institute believes that this range is in accordance with the intentions of Congress when it passed the Act.

In its comments on the proposed DOE-EIA uranium industry viability rule, the Institute did not take issue with the 37.5 import percent criterion, because it was established in the law. However, since the Institute supports the Administration's view that free trade is in the best interest of the nation as a whole, it believes that the U.S. should avoid the imposition of either stringent import ceilings or tariffs. This suggests that, though the industry may not be regarded as a growth industry now, it will regain strength in the second half of the 1980s and thereafter as inventories are drawn down and demand increases.

With respect to imports, the Institute is of the view that an over reliance on imports is not in the best national interest. While there may be those, as in the case of oil imports in the 1970s, who believe that the U.S. should consume foreign reserves before consuming domestic reserves, this is not sensible or realistic. Reliance on substantial levels of imports could result in U.S. utilities being vulnerable to supply interruptions and foreign cartel formation. In view of this, the Institute considers the Import Commitment Dependency level established in the viability criteria legislation and regulations of 37.5 percent to be reasonable.

The President's report points out that the national security is not jeopardized by the current low state of the domestic uranium industry nor is it likely to be in the next two decades. It concludes that technically feasible U.S. and Canadian uranium production capability would be more than adequate to cover the joint national security requirements of the two countries should the need arise. The Institute does not involve itself in matters of national security, but recognizes that there can be many beneficial consequences of free trade between neighboring countries, such as Canada and the U.S. The Institute also recognizes that there is a fine line between open and friendly relations with our neighbors, and placing our security of uranium supply in the hands of other nations. The uranium trade situation, as noted above, is in reasonable balance, however, the situation bears watching.

Recently, the domestic uranium mining industry has been building its case against DOE in this matter. They have begun to point to DOE as the villain of the story. The Institute objects strenuously to the charges made by the domestic miners that DOE is ignoring its responsibility to the miners under the Atomic Energy Act while at the same time subsidizing the purchase of enrichment services. Enrichment services are provided on a full cost recovery basis and the new US contract is necessary to resolve the DOE enrichment business problems. The Institute believes that when DOE's actions are examined in detail, they indicate that with the new enrichment contract by DOE, the domestic uranium suppliers are probably being better served in the long run.

The DOE uranium enrichment enterprise is being threatened by a separative work glut on the secondary market, low cost foreign competition and its own contracting policies. DOE's contracts, under one type, required customers to purchase unneeded SWUs and, under another type, allowed customers to seek supply elsewhere without penalty on relatively short notice. DOE is correcting these problems by taking two steps: offering a new contract that allows customers sufficient access to alternative supply and by moving forward with new technologies that will bring prices down to be competitive with the foreign supply.

The domestic uranium suppliers raised three issues with regard to the DOE uranium enrichment program: the Variable Tails Assay Option (VTAO) surcharge, split tails operation and the relationship between uranium industry viability and government enrichment policies.

The domestic suppliers claim that the VTAO surcharge lessens the additional uranium that enrichment customers would supply for a higher tails assay. As true as this point is, it ignores a more basic point: without the surcharge, DOE would not have offered the VTAO. Clearly, the domestic uranium suppliers are better off with a VTAO with a surcharge than with no VTAO.

By feeding the excess uranium required by a split tails operation from the DOE inventory at its original cost, the domestic suppliers claim DOE is subsidizing the purchase of enrichment services. The question raised here requires a detailed analysis involving all the complex factors affecting DOE's enrichment program. However, it seems clear that the domestic uranium suppliers are better served not having a government uranium inventory overhanging the market.

The domestic uranium suppliers claim that it is clear that if the Secretary of Energy determines that the domestic uranium industry is not viable, DOE must cease enriching foreign uranium for use in domestic reactors; we disagree. The two provisions of the Atomic Energy Act involved were enacted at different times and with different legislative histories. It is not clear that a non-viable determination automatically leads to such a cesation. No doubt a lengthy court battle would ensue if the domestic uranium suppliers pursued such a position.

Lastly, a healthy domestic uranium industry requires a healthy domestic enrichment program. It would make little sense to ship U.S. origin uranium to a foreign enricher only to ship it back as enriched uranium. The domestic uranium suppliers are best served by a strong U.S. uranium enrichment program.

The Institute is very aware of the importance of a healthy and thus, viable domestic uranium industry to the future generation of economic electricity by the nation's utilities. It believes that the draw down of inventories will result in the reestablishment of the mining industry in the next several years, and subsequent stable growth thereafter. It does not believe that the imposition of stringent embargoes and tariffs will serve either the national good or that of the uranium mining industry. Finally, the uranium viability regulations, as established in 1983, should be used in a circumspect manner to monitor the industry's condition in the future and to assure that an over reliance on imports is not likely to result.

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Statement on Behalf of a Group of Domestic Uranium Producers for the Energy Research and Development Subcommittee of the Senate Energy and Natural Resources Committee

September 12, 1984

This statement, which was prepared in conjunction with the testimony presented by the American Mining Congress, is presented on behalf of a number of domestic uranium producers, including Energy Fuels, Atlas Corporation, Rocky Mountain Energy and Western Nuclear, Inc. We all share the criticisms of DOE's May 1984 Report and the agency's October Viability Regulations expressed by Mr. Stevens on behalf of the American Mining Congress. We also wish to raise a number of additional issues relating to DOE nuclear fuel policies which are beyond the scope of Mr. Stevens' testimony. We will focus on three basic concerns in this statement. These concerns relate to DOE's "split-tails program", certain DOE enrichment policies, and DOE's non-implementation of section 161(v) of the Atomic Energy Act.

DOE Distribution of Stockpile Uranium

DOE has been selling and apparently intends to continue to sell uranium from the government's stockpile, principally through the so-called "split-tails" program.[1] For example,

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[1] In the words of the Government, the split-tails program "results in enriching services customers supplying less feed

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according to DOE's 1983 Uranium Enrichment Annual Report, DOE sold 1,613 metric tons of U+D3+UO+D8+U from the Government stockpile in fiscal year 1983. This is equivalent to the output at full capacity of two good-sized uranium mills. This is occurring, Mr. Chairman, at the same time when most of our private mills are shutdown and the remainder are operating far below capacity. In addition to these recent sales, DOE has informed us that it sold some 60,000,000 pounds of uranium from the stockpile between 1972 and 1980 through its split-tails program. We further understand that DOE has some 40,000,000 points of stockpile uranium available for sale. Half of the uranium in the Government stockpile is foreign-source.2/

DOE published two notices in the Federal Register in April stating that it intends to distribute stockpile uranium under the split-tails program at a price of approximately $9.00 per

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than that actually used to produce their enriched uranium requirements. The Government supplies, from its stockpile, the additional feed necessary for the customer's product, while a portion of the customer's cash payments constitutes payment to the Government for such additional feed used." 42 Fed. Reg. 57636 (Sept. 25, 1977).

2/ *See, e.g.*, U.S. DOE, Statistical Data of the Uranium Industry at p. A-5 (GJO-100(79), Jan. 1, 1979). When DOE presents data on enrichment of foreign material for domestic end-use, the agency does not include its own use of foreign-source feed due to the split-tails program. Domestic use of imported uranium is accordingly significantly understated in the statistics compiled by the agency pound of uranium oxide.3/ The GAO further indicates that DOE "will for the immediate future" be distributing stockpile uranium at a rate of $9.00 per pound in order to reduce its apparent enrichment costs to the $135 per SWU ceiling price which the agency is now offering under its new U.S. enrichment contract.4/ DOE's $9.00 price is not only below market price but also well below the costs of domestic production. The General Accounting Office has long maintained that pricing below market deprives the Government of reasonable compensation.5/ In addition, since the price is below domestic costs of production, it interferes not only with the development but also with the maintenance of an independent domestic source of supply. This seems to us inconsistent with sections 63 and 161(m) of the Atomic Energy Act.6/ The General Accounting Office has also questioned the wisdom of these sales in view of Government

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3/ See 49 Fed. Reg. 13413 (April 1984) (price of $26.00 per kgU in form of uranium hexafloride for uranium supplied via "split-tails"); id. 13414 (base charge at average historical cost); GAO, Report to the Chairman, Subcomm. on Energy Cons. and Power House Comm. on Energy and Commerce, Information on DOE's Costing and Pricing of Uranium Enrichment Services 16 (April 25, 1984) (GAO Report) ("acquisition cost is about $9 per pound").

4/ GAO Report, supra, at 16-17.

5/ See GAO Report, supra, at 17.

6/ 42 U.S.C. §§2093 and 2201(m) (prices charged by DOE must provide "reasonable compensation" and "not discourage the development of sources of supply independent of the Commission").

requirements for additional uranium which will emerge no later than the early 1990's.7/

To the extent that DOE is making sales from the government inventory via the split-tails program, AMC objects. We object even more to sales at a price of $9.00 per pound. It is improper for the U.S. Government, at a time of falling demand for domestic uranium and rising unemployment in the domestic uranium industry, to distribute stockpile uranium (uranium which was acquired at taxpayer expense), especially at cut-rate prices. This is especially so in view of the Government's expected future need.

When representatives of the uranium industry questioned DOE officials on this issue, we received various confusing responses. A first line of response by DOE is to implicitly admit that split-tails sales will occur but to argue that the domestic industry must accept them because distribution of stockpile uranium pursuant to split-tails is not a "sale" or "disposal" for money of the Government's inventory. But DOE,8/ its predecessors,9/ the Canadian government,10/ and experienced

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7/ *See* GAO Report, *supra*, at 17.

8/ 49 Fed. Reg. 13413 (April 1984) (split-tails "sales").

9/ Joint Comm. on Atomic Energy Hearings (March 1972) at 2309 & 2313 (AEC Statement) and 2330 (Dr. Schlesinger) (split-tails results in "disposing of the stock pile").

10/ Gray, The Great Uranium Cartel 98-99 (1982) (Canadians analyzed U.S. split-tails programs as sale of uranium to the market by U.S. government).

experts11/ all recognize that the "split-tails" program amounts to a sale of uranium to the exclusion of non-DOE competitors.

A second response by DOE has been to argue that the domestic industry must accept the split-tails program essentially because it has long been done that way. This argument is likewise arbitrary and unfounded. The "split-tails" program was originally conceived in the early 1970's as a means of distributing surplus government stockpiles of uranium to the open market during a period of rising uranium demand and increasing prices. But the conditions for which the program was envisioned no longer apply. The split-tails program is now outdated and unfair. It should be stopped and not reinstituted. Indeed, we believe that DOE is committed to stop the program. When DOE's predecessor, the Atomic Energy Commission originally formulated the split-tails policy, it indicated that the policy would be revised in the future to assure that it "will be consistent with maintaining the viability of the domestic uranium industry."12/ Further use of the government

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11/ *See* NRI, *The Split Tails Concept*, reported in *Status of the Domestic Uranium Mining and Milling Industry: The Effects of Imports*, Hearing before the Energy Res. and Dev. Subcomm. of the Senate Energy and Natural Resources Comm., 97th Cong., 1st Sess. at 367 (1981).

12/ AEC press release, Oct. 13, 1971, reprinted in *Status of the Domestic Uranium Mining and Milling Industry: The Effect of Imports*, Hearing before the Energy Res. and Dev. Subcomm. of the Senate Energy and Natural Resources Comm., 97th Cong., 1st Sess. at 435 (1981).

inventory in the split-tails program is now contrary to the maintenance of a viable domestic uranium industry. It is time for DOE to comply with its commitments.

Certain DOE Enrichment Policies

While we earnestly support the need for revisions in DOE enrichment policies to render U.S. enrichment competitive with foreign enrichment suppliers, we oppose DOE enrichment policies which benefit DOE at the expense of the uranium producers of this Nation. For example, we are concerned about the impact of the new U.S. enrichment contract on the demand for uranium. DOE officials have acknowledged that the contract, if widely accepted, will have a negative impact on demand. This negative impact could include a reduction in demand in the range of 20 percent. (This detrimental effect was not included in the projections contained in DOE's May 1984 Report.13/) To take another example, we are troubled with provisions in the new enrichment contract whereby DOE penalizes an enrichment customer's selection of tails assay through a graduated surcharge.14/ Assistant Secretary Longenecker has informed

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13/ See United States Uranium Mining and Milling Industry: A Comprehensive Review xx (May 1984).

14/ A brief explanation is in order. Natural uranium contains about 0.7% U-235. When a customer delivers natural uranium to an enrichment facility, he specifies an amount of U-235 to be

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representatives of the industry that the surcharge penalty preserves some $50,000,000 in additional revenue to DOE per year. However, this is revenue taken at least in part at the expense of the domestic uranium industry. We believe that DOE's "VTAO surcharge" program has the effect of decreasing demand for domestic uranium by several million pounds per year. We believe that this is simply another example of DOE enrichment policies and DOE misuse of market power in the nuclear fuel area to maximize the agency's enrichment program at the expense of the domestic uranium industry. We feel that this policy is contrary to the maintenance of a viable domestic uranium industry.[15]

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"left behind" in the depleted uranium or tails. This value is known as the tails assay. The economically optimal tails assay varies depending upon the price of uranium and the price of enrichment. When uranium is relatively inexpensive, as now, a customer would prefer to supply more uranium and to purchase less enrichment service. He would accomplish this optimization, if allowed, by specifying a higher tails assay (e.g., 0.35%). DOE charges a premium or penalty on free choice of tails assay, or, in some cases, simply bars choices outside a given range. This forces customers to purchase more enrichment and less uranium than they otherwise would.

[15] We understand that DOE sometimes contends that penalization of selection of tails assay is appropriate because the agency incurs additional costs in providing that service. However, we believe that DOE has considerably overstated the actual costs of providing an unpenalized variable tails option. Moreover, we note that other enrichers do not penalize the choice of tails assay.

Section 161(v)

Nuclear power has been consistently endorsed by numerous Administrations as important for purposes of achieving the goal of energy independence. But nuclear power contributes to energy independence only so long as we retain a viable domestic uranium industry in this country. In 1964, the Joint Committee on Atomic Energy termed a viable domestic uranium industry an integral part of the nuclear fuel cycle 16/ and essential to national security.17/ This view is codified in Section 161(v) of the Atomic Energy Act which requires DOE to assure the maintenance of a viable domestic uranium industry.18/ For many years, the Government pursued policies to assure the continued existence of such an industry.19/ Indeed, investments were

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16/ Senate Report 1325, 88th Cong., 2d Sess., 1964 U.S. Code Cong. & Admin. News 3121.

17/ *Id*. at 3135. *See also* 110 Cong. Rec. 20145 (1964).

18/ 42 U.S.C. §2201(v).

19/ In response to section 161(v), the Commission adopted criteria prohibiting enrichment of any foreign-source uranium intended for domestic end-use. 31 Fed. Reg. 16479 (1966). The Commission proposed revised criteria in 1973. 38 Fed. Reg. 32595. The proposed revised criteria, which were adopted, gradually lifted the restriction beginning in 1978. There is now no restriction. The American Mining Congress in comments submitted on June 15, 1973, opposed lifting enrichment restrictions. AMC warned that "any . . . attempt to maintain the present depressed uranium price by relying upon imports would undoubtedly bring domestic uranium exploration and expansion to a virtual halt . . . . Furthermore, such action could only be

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made, communities were developed, and workers' lives revolved around the Government's commitment. Unfortunately, the Government's word has proved to be unreliable. The Department of Energy is ignoring the plight of the industry and is taking actions directly contrary to its viability. We regret that the recent Report by DOE does not more clearly indicate the resultant collapse which is occurring.

As we understand DOE, the agency claims that it intends to maintain a viable domestic uranium industry by steps such as licensing reform so as to permit increased reliance on nuclear power for electrical energy needs. This seems to us to be a very hypothetical and, some would say, dreamy solution. We have seen little progress in DOE's "reform" program thus far. Indeed, a recent report by an AIF Study Group composed of utility executives -- people who are well aware of DOE's proposed reforms -- flatly declares that "[n]uclear power cannot at this time be considered a viable option on which to base new electric generating capacity. . . ."20/ In any event, the domestic uranium industry is hardly in a condition to gamble on DOE's

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effective until foreign producers judged it in their best interest to increase prices, at which point the domestic uranium industry would not be able to quickly respond with increased production."

20/ AIF Study Group, Nuclear Power in America's Future iii (June 1984).

success, which, if it occurs, will assuredly be in the remote future when "we will all be dead."

DOE claims that its current nuclear fuel policies will restore vigor to the enrichment business and that this will benefit the uranium industry. Unfortunately, most of the burden of bolstering DOE's business is being assigned to domestic uranium producers. We believe that this is not only unfair but also contrary to the policy and language of section 161(v). In any event, if DOE is successful in maximizing its enrichment business and if there is some benefit (as DOE claims) to the uranium industry, the industry benefitted will not be the U.S. domestic industry but instead the producers of South Africa, Canada, France, and Australia, many of which are owned or dominated by foreign governments. The U.S. industry, we fear, will have largely vanished, taking with it both the jobs and the energy security and independence originally promised by American nuclear power.

Conclusion

The domestic uranium industry is in a seriously depressed condition. It faces formidable competition from subsidized foreign imports. The domestic industry is hardly in a position to bear additional costs and burdens due to ill-considered DOE nuclear fuel policies.

DOE must modify its nuclear fuel policies to assure the maintenance of a viable domestic uranium industry and to avoid undercutting the domestic industry as an independent source of supply. We would welcome an opportunity to work with the agency to accomplish these ends. Our efforts in this regard to date have not been fruitful. We appreciate your continued interest and assistance in this regard. Thank you for this opportunity to state our views.

ERICKSON'S ADVENTURES

Aug. 21, 1984

Alan K. Simpson, Senator
State of Wyoming
Washington, D.C. 20510

Dear Senator Simpson:

I do appreciate having the opportunity to review the report titled "United States Uranium Mining and Milling Industry", prepared by the U.S.Department of Energy and I thank you for it. I have followed such reports prepared by the US DOE and its direct predecessors with keen interest for the past 30 years. Perhaps this new report will break the historical pattern of being out of date by the time published and near totally in error as far as any meaningful long term projections are concerned.

I state this not so much as a criticisim of the agencies involved but, rather, to highlight the difficulty in trying to forecast something as dynamic, complex and of major importance as the impact of nuclear power on the world energy and political picture.

For example: Australia is known to have 25% or more of the known world's uranium reserves. Yet they have repeatedly restricted its production. They have done so because nuclear energy and its everbroader use will have a continuing and strong negative affect on their coal markets.

We know that nuclear energy has replaced some of the demand for oil and thus, has contributed to the decline of the power of such as O.P.E.C.

We know that as nuclear power has had an ever growing affect on the world's oil and coal markets, it has become an evergrowing political issue.

In truth, we today, even with the benefit of hindsight, can not accurately state the total effect that Nuclear Power has had on the world's energy, economic and political picture. We do know that it has been substantial. We know that the political opposition to its use appears to grow in direct proportion to its effect on the world oil prices.

If we can not tell of its past effect, how can we begin to forecast its future effect? When may the world decide that the elimination of our forest and streams through acid rains is too great a price to pay for the privilege of burning hydrocarbons? When may the world say, "We are tired of being the economic and political pawns of such as O.P.E.C. and the International Oil Companies, let us go with nuclear / electrical power and substantially reduce, if not eliminate, these silly games which lead us down the path to global war." How then does one take such variables, of such a magnitude, and accurately predict the future markets and price of uranium?

The reserve picture is equally confusing. It can be demonstrated that under existing laws, rules and regulations, it is no longer technologically feasible to conduct conventional underground uranium mining. If this be true then we can eliminate between 52% and 66% of the reserves in the U.S. as stated on page 24 of the report. Several major company officials have expressed a strong reluctance to conduct uranium mining in the state of Wyoming because of our D.E.Q. Does this require a re-evaluation of over a third of our nation's reserves?

Supposedly Canada has a uranium reserve picture somewhat in parity to that of the U.S. but their mines are reported to be much richer in grade. What is not stated is that these reserves are near the Artic circle and that despite the high grade, the profit picture, as reflected by such as the annual report of Asamera Inc., is anything but bright. A 4% increase in cost, which could be caused by an extra week of severe winter weather, would wipe out a year's profit. Besides, the Canadian tax structure and general political attitude toward uranium mining is not favorable to this industry. The major reason the companies are active in this area is that it looks good in the annual statement, and as long as you don't look too close at the financial section it appears to be a major asset.

The basic assumption has also been made that the piles of scrap metal, which used to be uranium mills, can be put back on stream by flipping a switch. In several cases this is not true, even if the government regulations allowed. Besides, recent industry numbers show that it could take as long as seven years to simply get the necessary licenses to build a new mill.

I would estimate that under existing rules, regulations and conditions, and limiting ourselves to existing mining methods, the reserves and production capababilities in the U.S. could be over stated by at least 100%.

I can also show you extensive studies which demonstrate that with the use of new technology, we can add 25% to 50% to our recoverable reserves and do so on a world competitve market price. So, are the numbers presented 100% too high or 50% too low.?

In my opinion, one of the surprises of this report came on page 41, in the summary and conclusions of the present status of the Uranium industry. Only there does it state, and even then very obliquely, that the present boom and bust in the uranium mining industry might be a direct result of bureaucratic bungling. When it was believed that uranium might be in short supply, the U.S. Goverment demanded that the utilities contract for some 7 years advance supply. Not so surprisingly, the price of uranium went from $13 / pound to over $60. Then, when it became apparent that we could supply the future demands of uranium, the U.S. government eliminated this requirement for advance supplies, and helped substantially to create the surplus in the market place, so the price dropped and we now have the present "bust" in the uranium industry.

I believe that the reserve figures stated in this report indicate only that our uranium reserves are of sufficient amounts to sustain the world nuclear energy industry long into the forseeable future. Having enough fuel to burn in our present and future reactors is no longer a concern. Just who and where it is going to be produced is another matter.

We, the United States, can be one of the world's more stable, dependable and economic sources of nuclear fuel if industry and the government will work together. If they won't, forget uranium mining and milling in the United States.

What is needed first and foremost is a clear and precise statement of policy on the mineral and energy production in this country by the U.S. Government. Without that, we shall continue to have the stops and starts of the past which produce the booms, the busts and a great deal of waste. We shall continue to have the actions of one government agency supporting policies which the actions of other agencies cancel out. We shall continue to have a handful of the industries representatives using, or attempting to use, the government rules and regulations to their companies benefit at a cost to the industry and our nation.

Nearly one hundred and fifty years ago, the rules and regulations were initiated which guided this nation's mining industry until the last decade or so. For its time and conditions, it created a strong industry and thus contributed to an economically strong nation. But time and conditions changed and a social consciousness was imposed upon the industry through government regulation. These new laws represent the people's way of saying that the extractive industries will produce in an environmentally and humanly acceptable manner. The laws don't say just how industry will do this, but they do say that they will. It is left to the appropriate government agency to say just how it will be done. Industry's response has been that they will simply do as they have done for the past hundred years and only modify their methods to the minimum degree necessary to comply with the letter of the law. The intent of the laws appear to be soon forgotten by both industry and the regulatory agencies.

In my opinion, we can have a strong and healthy uranium industry in the United States at any time we want. It requires only a cooperative, supportive attitude on the part of the government agencies and a willingness and desire to support needed changes within the industry by the industry. Of the two, I see the reluctance of industry to change as the major of these two obstacles.

If I were the Czar of the United States mining and uranium industry I would say the following:

MINING IN GENERAL:

RULE 1:

It shall be the general policy of the United States to assume a general attitude similar to that of the Japanese. That is, that the United States will depend upon the developing countries of the world to provide us with the basic mineral resources needed to maintain our nation.

EXPLANATION OF RULE 1:

Whether it has been the intent of our previous legislative and administrative bodies, this is actually where we stand today. All this rule does is simply state the actual policy which exists in this country at this time.

RULE 2;

Wherever we have world class ore bodies - such as the Missouri lead mines, the Wyoming trona mines, the bentonite mines of Montana and Wyoming, the Coeur d'Alane silver mines - we shall provide the maximum government assistance possible to maintain these mines as competitive on a worldwide market basis without actually providing any form of subsidies, tarifs or import restrictions.

EXPLANATION OF RULE 2:

Again, this is only a reflection of reality. With the world population trends, the absolute necessity of developing countries to provide more and more basic industries, we can only hope to compete with either the world class ore bodies or with those minerals which lend themselves to a greater degree of high technology.

RULE 3:

Every government agency involved in any regulatory activity as related to the mining industry would be required to reduce the number of rules and regulation now existing to an absolute minimum of 20% of the number which now exist. In all agencies there shall be a triumvirate arrangement between the agency, industry and a third party arbitrator. Only when the agency and industry does not agree on just what is the best way for the agency to proceed in order to attain the intent, rather than the letter of the law, would the arbitrator enter in. Any Gov. agency that did not attain this 80% reduction in rules and regulations within one year would be totally eliminated. (It is nice to dream!)

EXPLANATION OF RULE 3;

I sincerely believe that at least 80% of all government rules and regulations as related to the mining industry are either unneeded, redundant, superfluous or all of the above. Rather than advisories, I believe that the proper role of the government agencies should be one of support to the industry, working to attain the objectives of our legislation.

URANIUM MINING AND MILLING:

STATEMENT OF NATIONAL POLICY:

. It shall be the policy of the United States to strive for total independance from any and all foreign sources of energy for the United States. The U.S. Gov. would do everything possible to encourage our own energy production short of tarrifs, import restrictions and subsidies.

RULE 1:

The U.S. and State governments would do everything possible short of subsidizing, import restrictions and tariffs to aid and encourage the immediate production of those uranium reserves which are either fully or partially developed for existing mills and where it can be demonstrated that these reserves can best be mined and milled from these facilities. No new conventional mills would be allowed and all old mills not producing would be dismantled.

EXPLANATION OF RULE 1:

The existing conventional uranium mills of today represent the best of the technology which was available 3υ years ago. It did the job then, when needed, and we should be grateful for there past existance. Today, they are polutants and extremely wasteful of our uranium resources. We should see that their immediate economic use should be accomplished and then the whole concept of mining and milling, which they represent, should be abandoned.

I would allow the existing mill tailings to be redeposited into the open pits from which they came. If the mill was one which was built under the original Atomic Energy Commission's License of the 1950's, I would place the burden of tailings disposal 100% with the federal government. They purchased the raw ore, paid a set fee to have it milled, and took the produced uranium. It is not fair to now come back to some of these mills and say "Now you shall clean up our waste piles at your expense."

RULE 2:

In locals such as Green Mountain Wyoming, only in situ ~~mining~~ would be allowed regardless of the existance of conventional mills.

EXPLANTION OF RULE 2:

Conventional mining methods i.e., open pit and conventional underground mining, will recover only 50% (plus or minus) of the total uranium pounds in any given resource body. In other words, historically we have wasted 50% of our resources with conventional mining methods because of grade thickness cutoffs. This need not be if we use in situ methods where 100% of the resource is subjected to extraction.

In Green Mountain, Wyo. continued use of conventional mining methods will destroy the environment needed to conduct in situ mining and only a small portion of the total uranium resource under this mountain would ever be recovered. Conventional mining will also destroy the natural and beautiful habitat which now exists there. A habitat which could be enhanced with in situ mining.

SUMMARY :

I have now stated that one of the problems with the uranium industry is and has been the bungling of beaurcratic agencies; that this industry is extremely overregulated; that industry itself is the primary culprit in this situation and that is because of their reluctance to change; that we as a nation and as a world have adequate resources to sustain a substantial uranium industry for the foreseeable future.

Conclusions:

Resources in the ground and piles of scrap metal on the surface do not a uranium industry make. We must have a stated national policy as related to mining and especially as related to the providing to our nation of energy resource material. We should depend on foreign sources for our minerals, with a few exceptions involving world class ore bodies, but we must do everything short of tariffs, import restrictions and subsidies to encourage our own energy production. A broad and general housecleaning of the regulatory agencies as related to the mining and extractive industries is mandatory.

I see little hope of any of this happening until industry itself first recognizes that it must change and actually begins initiating some of these changes.

If our legislature waits for unanimous agreement within the industry as to what is to be done, nothing shall be done. I believe that we should do that which is best for our nation and that by doing so we will also be doing what is best for the extractive industries. both in the short and long term. To do nothing can well lead to disaster. And to play the normal politics with this issue is for all practical purposes the same as doing nothing.

So Senator there are my views on the subject having reviewed the report. I look forward to hear how the "viability" issue will be treated. From my viewpoint it is impossible to say that we have a viable uranium industry in the United States today.

I wish to say that I am pleased that we have such as you representing us in Washington. Good Luck.

Respectfully Yours

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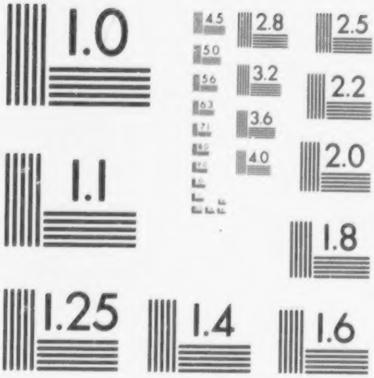
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